UNESCO

A WINDOW OPEN ON THE WORLD

The UNESCO Courier

JULY-AUGUST 1962 (15TH YEAR) - PRICE 2/-STG. (U.K.) - 60 CENTS (U.S.) - 2 NF (FRANCE)

FREEDOM FROM HUNGER

LEAN YEARS of famine in Ancient Egypt are recalled by this emaciated figure carved in stone, from the pyramid of Ounas, near Gizeh. It symbolizes the hunger which gripped the land when no flood waters descended the Nile and harvests failed. (See article on page 15)

Louvre Museum © M. Chuzeville, Paris

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Contents

No. 7-8

PUBLISHED IN EIGHT EDITIONS

English
French
Spanish
Russian
German
Arabic
U.S.A.
Japanese

COVER PHOTO

This old man from Ceylon has been marked by a lifetime of hard toil, by a struggle to win from the soil, with only the most primitive of means, food for himself and his fellows. But his dignity and resolute gaze speak for all simple men of the land, expressing the undefeated spirit of those for whom poverty has never become a valid cause for resignation

United Nations

SPECIAL DOUBLE ISSUE

Freedom from Hunger

5 **EDITORIAL**

7 **THE CHALLENGE OF HUNGER**
By Dr. B.R. Sen

15 **FAMINE, THE GREATEST SCOURGE OF HISTORY**
By Georges Zottola

20 **HIDDEN HUNGER**
The world-wide effects of malnutrition
By Prof. Michel Cépède

24 **MAPS OF HUNGER**
The daily food ration of every nation

26 **FOOD TABOOS AND PREJUDICES**
By Dr. Marcel Autret

32 **THE FOOD DESTROYERS**
Ravages of insects and other pests
By Dr J. Vallega

38 **FOOD AND PEOPLE**
The global balance sheet of a critical problem

47 **THE FIRST VICTORIES**
Positive achievements in the fight against hunger
By Dr. Frank W. Parker

54 **A WORLD STRATEGY FOR SURPLUS STOCKS**

55 **THE ANATOMY OF UNDERDEVELOPMENT**
The first of a series of articles on problems of economic growth

57 **WAKING THE SLEEPING LANDS**
A story of U.N. Technical Assistance
By Kathleen McLaughlin

64 **FOR FURTHER READING**

65 **LETTERS TO THE EDITOR**

66 **FROM THE UNESCO NEWSROOM**

(M.C. 62.1.171 A)

Published monthly by
The United Nations Educational, Scientific and Cultural Organization

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THE UNESCO COURIER is published monthly, except in July and August when it is bi-monthly (11 issues a year) in English, French, Spanish, Russian, German Arabic and Japanese. In the United Kingdom it is distributed by H. M Stationery Office, P. O. Box 569, London, S. E. 1.

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The Unesco Courier is indexed monthly in The Readers' Guide to Periodical Literature published by H. W. Wilson Co., New York.

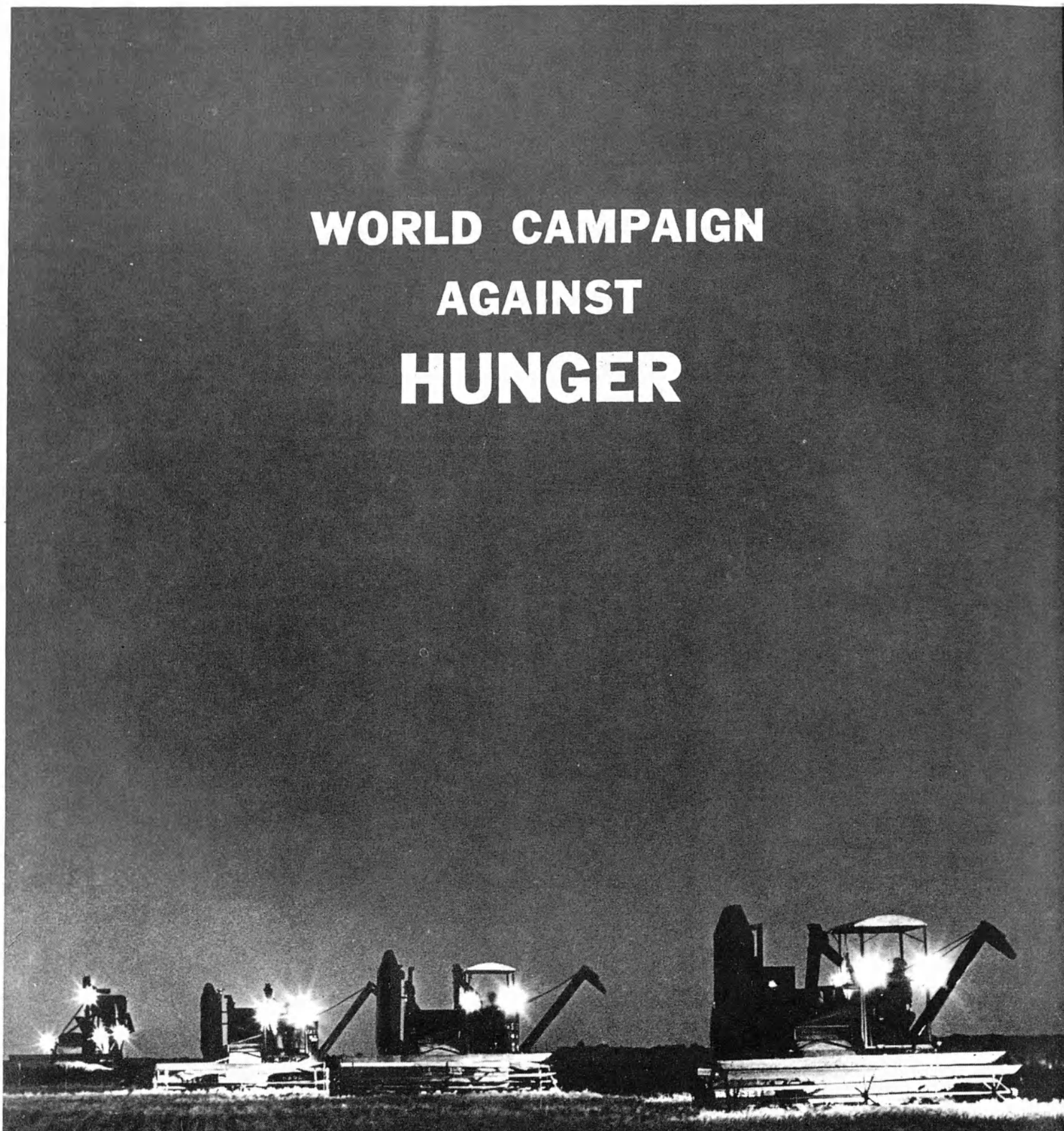
Annual subscription rates : U. S. $ 3.00 ; 10/-stg. ; 7.00 New Francs or equivalent. Single copies 1/-stg. 30 cents (U.S.) ; 0.70 New Francs.

Sales & Distribution Offices
Unesco, Place de Fontenoy, Paris 7e.

All correspondence should be addressed to the Editor-in-Chief.

UNESCO ARCHIVES

WORLD CAMPAIGN AGAINST HUNGER



When hail or rain threatens to ruin a crop, harvester crews in the United States work around the clock. Combines like those shown here can do the work of 40 farm hands. Right, wheat harvesting near Lahore, Pakistan.
USIS

The first half of the 20th century has witnessed three major revolutions. The political revolution has brought self-government to nearly a third of the world's population and has brought their aspirations for a better life to the forefront of world attention.

The revolution in communications has broken down the barriers of distance and language, and the dynamisms of ideas can no longer be contained within the limits dictated by social privilege or political considerations.

The demographic revolution has imparted to the challenge of poverty and want a new dimension.

It is against this background that the Freedom from Hunger Campaign was launched in 1960 by the Food and Agriculture Organization of the United Nations (FAO). Its main objectives are twofold: first, to create a world-wide awareness of the problems of hunger and malnutrition which afflict more than half of the world's population and which, apart from the human suffering and human degradation that they involve, pose a serious threat to peace and orderly progress ; and second, to promote a climate of opinion in which solutions to these problems can be organized both on a national and on an international basis.

In the short time since its launching, the Campaign has already provided a focus for co-operative endeavour for international organizations, national governments, non-governmental organizations and various citizens' groups all over the world. The 104 member nations attending the biennial FAO conference in November 1961 paid unanimous tribute to the significance of this Campaign for the future well-being of the world.

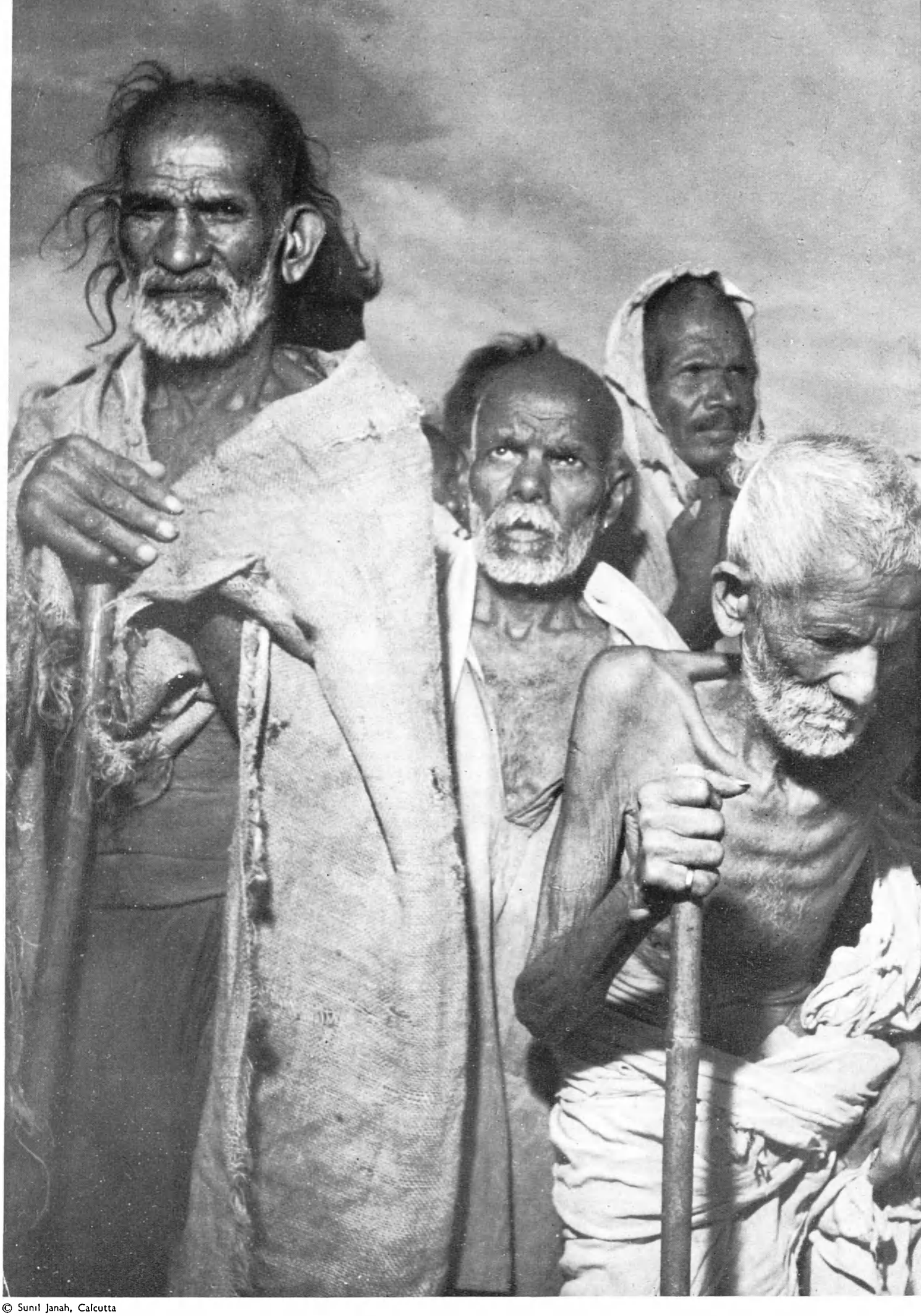
The Freedom from Hunger Campaign attempts to attack the problem of hunger on a broad front and at all levels of economic and social thought and action ; but for practical purposes it defines three sectors of operation: (a) information and education, (b) research, and (c) action.

The information and education programmes will help bring to citizens everywhere a living awareness of the concrete facts and issues, and provide bases for deciding what new national and international policies and action programmes are needed. This effort to create informed and active awareness will rise to a climax with the World Food Congress to be held under FAO auspices in 1963.

Many international, professional and citizens' groups will hold forums on Campaign issues this year and in 1963. Many national Campaign committees will also organize similar discussions. Representatives from all these bodies are expected to participate in the World Food Congress and help bring into focus policies and action for plans for the future.

This special issue of The Unesco Courier has been prepared to help people throughout the world to understand the great issues involved. An attempt has been made to summarize in popular form the major facts known and the agreed conclusions of experts up to now. The Editors hope that this special number will provide study groups in schools and public discussion groups with useful and reliable material on a critical world problem that is of vital concern to us all.

FAO photo by W. Williams



© Sunil Janah, Calcutta

THE CHALLENGE OF HUNGER

by Dr. Binay Ranjan Sen
Director-General, FAO

Innumerable weak and hungry people were driven by the famine which gripped southern India in 1945 to wander the countryside in search of food.

The greatest challenge that faces mankind today and in the coming decades is the problem of feeding the growing population of the world. While the world population is increasing at an unprecedented rate, food production in the areas of the world where most people do not have enough to eat is lagging. Thus, today, mankind as a whole is not being adequately fed and there is a population increase of such dimensions that by the end of this century—possibly earlier—the number of mouths to be fed will be more than double.

The implications of this situation are grave in the extreme; yet, except for a few prophetic voices crying in the wilderness, it is only in recent years that the leaders of nations, the philosophers, the thinkers, the scientists and, later still, the governments have awakened to the perils of the food and population problem.

Indeed, FAO has tried to bring this dual problem into focus, through the McDougall Memorial Lectures given by Professor Arnold Toynbee (1959) and Mr. John D. Rockefeller (1961), and through the Freedom from Hunger Campaign, launched by FAO on July 1, 1960.

For several years FAO has pointed out the dangers inherent in the situation. It has stressed that food production as a whole, but especially in the underdeveloped and developing countries, is not increasing fast enough. The rate of population growth in the developing countries is well over 2 per cent, while the volume of agricultural production is increasing at slightly less than 3 per cent per annum—a margin which is clearly precarious. Any major set-back in agriculture in any part of the world owing to climatic or other natural factors could quickly wipe out the gains which have been so painfully won. The latest statistics reveal the realism of this warning.

Estimates of world agricultural production in 1960-1961 (excluding Mainland China) show an increase of no more than one per cent over production in the previous season —which is less than the estimated rate of population growth of 1.6 per cent. Further, if Mainland China is included in the world agricultural production figures, the total production for 1960-1961 would probably be less than that of 1959-1960 instead of a one per cent increase. And set-backs due to bad weather in several regions of the world indicate that the 1961-1962 production may again be small.

But let us look a little more closely at food production

CONT'D ON NEXT PAGE

Millions still go hungry

as seen in recent years. Since the Second World War there has been a great expansion in the production of food and agricultural goods but, unfortunately, by far the largest part of this has taken place in Europe, in North America and in Oceania.

All these are countries where standards of living are high and the people generally are well fed and adequately nourished. In the food deficient regions of Africa, Asia and Latin America the increases have so far barely kept pace with the population increase.

Thus, although the Far East Region, which is the worst nourished and most populous area in the world, has had a good harvest for three successive years (excluding Mainland China), the 1960-1961 food production per head has only brought consumption levels up to those of pre-1939.

In other words, improvements in diets which could have been expected as a result of increases in food production have, in fact, been largely nullified by population increase. In Latin America, for example, per capita food production continues to lag behind pre-war levels. In the Near East, however, per capita production is now about 10 per cent above the low levels prevailing in the pre-war period. In Africa, a rather stationary situation has prevailed with some ups and downs. These regional figures, of course, conceal wide differences among individual countries.

A statistical study of the incidence of hunger and malnutrition was recently made by Dr. P. V. Sukhatme, Director of the Statistics Division, FAO, based on the international reference scale for calorie requirements and on the variation in energy expenditure among men of the reference age group.

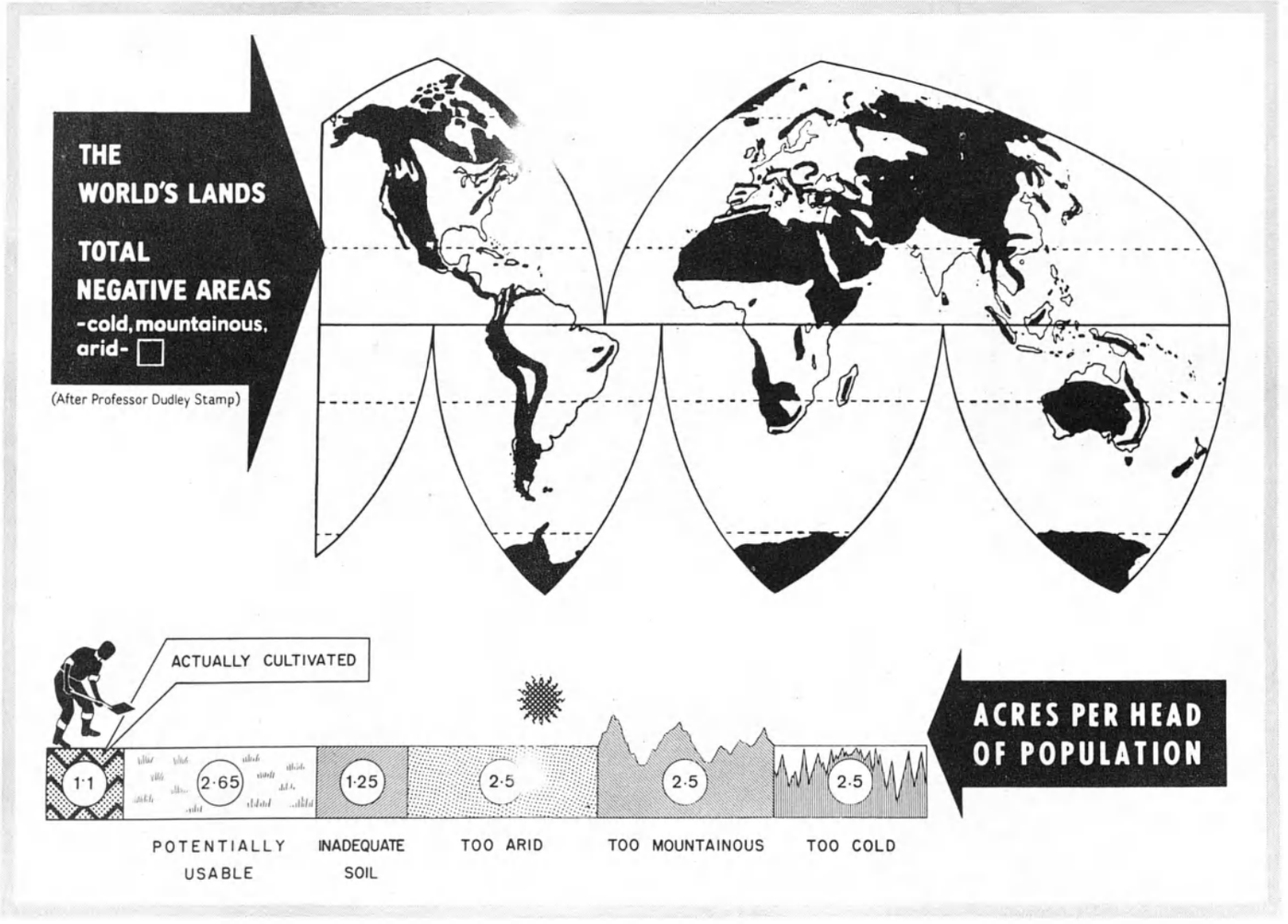
Applying the FAO calorie standards as a basis of comparison for the quantitative aspects of the diet, the study showed that calorie supplies in Europe, North America and Oceania are of the order of more than 3,100 calories per capita per day and exceed the requirements by about 20 per cent.

In the Near East, Africa and Latin America they are about equal to requirements, amounting to some 2,400. In the Far East, the supplies are of the order of only 2,050 compared with a calorie requirement of some 2,300. The supply thus falls short of the requirement by 11 per cent.

This gap is particularly striking when compared with the total calorie supplies of other regions. Thus, the shortage in the Far East is of a quantity large enough to feed the entire population of the Near East and still have some to spare.

Even for other regions where the overall picture looks balanced there are wide variations within the region. In the Near East, for instance, there is apparently enough food in a group of countries where one-half of the population lives. But the other half lives in a relatively poorer area. The calorie supplies in this area are only 2,100 to 2,200 per capita per day. It is therefore justifiable to conclude that many millions of people in the world still go hungry at least for a part of their lives.

Thus, a recent study conducted in FAO has shown that the gap of 11 per cent between the calorie supplies and the calorie requirements in the Far East is shared by one fifth to one fourth of the population of the region. Since this region comprises one half of the total world population it is clear that a conservative estimate of the proportion of undernourished in the world is between 10 and 15 per cent. In actual numbers this means that between 300 and 500 million go hungry for part of their lives even in normal times.



EDUCATION NOT A LUXURY

It has been said that it is too much to expect countries fully engaged in building their economies to make sacrifices for education. " Sacrifice " is a word I cannot accept. There is no such thing as making "sacrifices" for education, and the funds set aside for this purpose are never sacrificed. On the contrary, they are an enrichment and investment for a nation. Perhaps the greatest intellectual task of Unesco today is precisely this to prove that money used for education is not just money spent, but money invested. For education cannot be considered a luxury. It forms part and parcel of the equipment of every country. And all the material and technological equipment to develop industry or agriculture would be wasted to a great extent without prior investment in the human resources needed to exploit a nation's material resources.

René MAHEU
Acting Director-General of Unesco
in an interview on the French radio, May, 1962

Differences in protein supplies between countries are very striking. For example, for the USA the average daily per capital figures in grammes for total protein and animal protein for 1959 were 93 and 65 respectively, while the corresponding figures for Peru were 52 and 13, for India 51 and 6 and for Ceylon 46 and 9. There is very concrete evidence that much ill-health and disease due to lack of protein are prevalent in many parts of the world. Protein malnutriton affects mainly young children aged 1-4 years and in many underdeveloped countries a high proportion of children suffer from it. It can safely be concluded that existing supplies of protein, particularly protein of good quality, are seriously inadequate in many of the developing countries.

Taking into account the evidence of numerous small-scale experiments on social feeding with better diets, reported from different parts of the world, showing increased working officiency and vigour, and also the numerous reports on malnutrition, particularly in children, with effects ranging from retardation in growth to serious diseases and death prevailing in these countries, the incidence of malnutrition in the less-developed countries, relative to the United Kingdom and France, may be placed at well over 50 per cent. In other words well over 1,000 million people in the world today suffer from various degrees of malnutrition.

I have mentioned these figures to show the magnitude of the food problem as it exists today and to indicate the even greater problem which will face the world in the coming years. It is clear that only the most heroic efforts to increase food production and raise standards of living in the underdeveloped countries will enable us to feed tomorrow's six thousand million people.

The possibilities exist to bring about an increase in food production at a much greater rate than that being achieved at the present time. What has been done in Europe, North America and some other parts of the world

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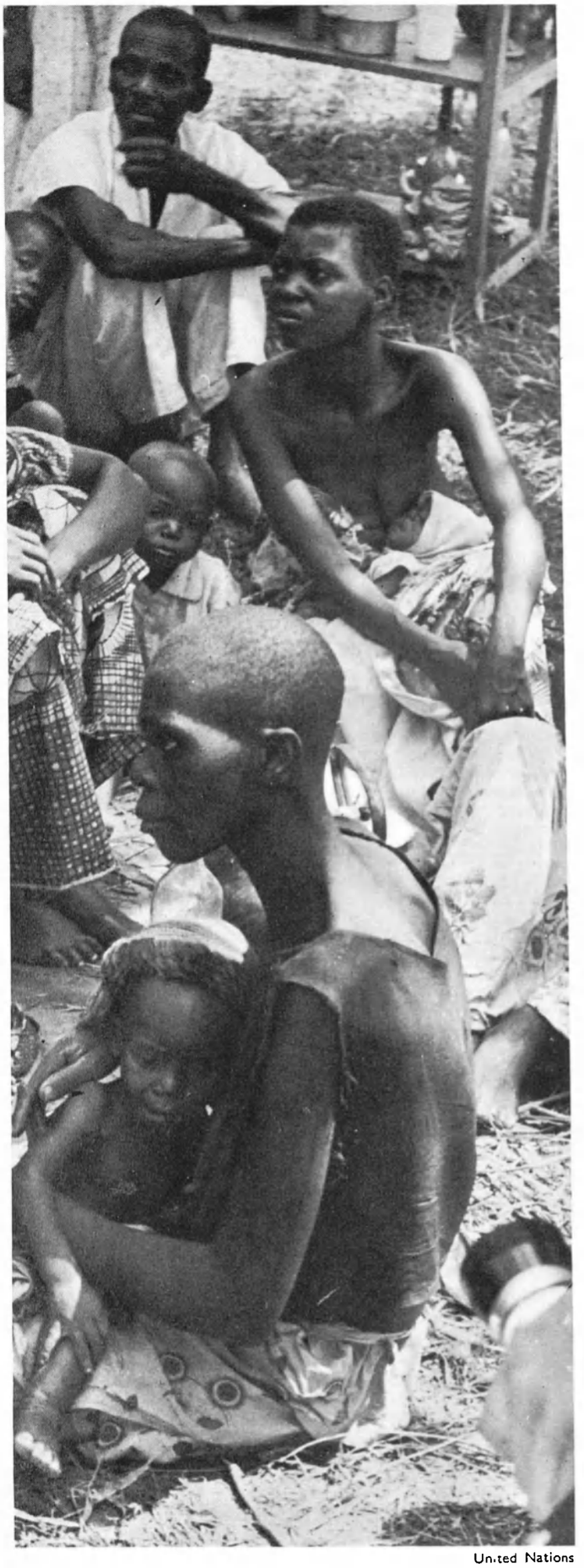


United Nations

Refugees receive food and medical care at a dispensary in South Kasai, Congo, in 1960, when emergency food supplies were rushed in under a relief programme to fight famine caused by political and social upheavals.

Wheat yield doubled in Mexico

can also be done in the regions where food deficiencies now exist.

It is not so long ago, in terms of history, when the standard of living and levels of nutrition in Europe were low and famines were recurrent. But through technological progress in agriculture and as the result of the general economic and social development of Europe, famine conditions are non-existent in these parts of the world.

This freedom from hunger has been achieved even though there has been a tenfold or more increase in population since the times when famines and food shortages were a common occurrence.

On the basis of existing scientific and technical knowledge, food and agricultural production can be increased substantially in all the underdeveloped countries, a fact that needs hardly to be argued. For instance, tests have proved that the use of improved varieties of seed alone could ensure increases in crop yields up to 50 per cent. If such seeds are used along with improved agricultural practices, more fertilizers, better irrigation, mechanization, double cropping—to mention a few of the more obvious steps—the increase in production of the great range of food crops could reach several times its present level in the underdeveloped countries.

This point was made recently by Professor D. L. Linton of the University of Birmingham in an article in the journal of the British Association for the Advancement of Science. In writing on population and food in the tropical world, he stated: "... what has been done in Europe can be done in the tropics. It is not desirable, as some agriculturists thought a generation ago, to substitute European type crop rotations and cultivation practices for those of the tropics, but it is very necessary to find ways of bringing to tropical husbandry the benefits of scientific knowledge and especially of appropriate fertilizers.

"The average yield of wheat per acre in Pakistan today is no more than that of England in the fifteenth century and only a quarter of the modern yield. That it can certainly be raised is dramatically shown by the way in which the average wheat yield of Mexico—the most advanced of all the tropical countries—has been doubled in the last ten years. The staple food grain of Mexico, however, is maize not wheat, and here the National Maize Commission created in 1947 is undertaking an agricultural revolution. Regional centres supply hybrid maize for seed, specify cultivation techniques and necessary fertilizers, and already the national harvest is three times what it was twenty years ago.

"Even in the lands of intensive rice cultivation the possibilities of deriving more food from the soil are far from exhausted. The average yield of rice per acre in

Primitive farming techniques are one of the chief reasons why people in some countries are unable to win from the soil all the food it is capable of producing. Viet-Nam farmer (right) returning after the day's work, carries a rudimentary plough and harrow—all he has for working the land.

© Pierre Pittet, Geneva

THE FACE OF FAMINE

It happened to me too, but I could not see myself, only what happened to others: saw their flesh melt away and their skin sag and sink between their jutting bones, saw their eyes retreat into their skulls, saw their ribs curve out from under the skin; and what withered the young bore doubly hard on the old and they were emaciated twice over.

But of us all Kuti suffered the most. He had never been a healthy child; now he was constantly ailing. At first he asked for rice water and cried because there was none, but later he gave up asking and merely cried. Even in his sleep he whimpered, twisting and turning endlessly, permitting no one to rest. Ira was gentlest with him, and tirelessly patient, nursing him in her skinny arms and giving him most of what came to her. But more often than not he turned away, unable to take the rough food we offered, and then she would hold him against her and give him her breast, and he would pull at the parched teat and be soothed, and for a while his thin wailing would die away.

KAMALA MARKANDAYA

© from "Nectar in a Sieve"

Published by: Putnam and C°, London.; The John Day Co. Inc., New York.

AN EVIL FOR ALL MEN

The hunger which ravages immense areas of the world is an affliction for all men everywhere; and all peoples, whether famished or well-fed, must fight this evil, for in this struggle there is no place for neutrality.

ILYA EHRENBURG

Speaking at the "Rencontres Internationales de Geneve", 1960

India today is no more than the yield in Japan nine or ten centuries ago, and only a quarter of the current Japanese yield. Small wonder that the suggestion has recently been made that the best form that western aid to India could take might be the building of 40 or more regionally-distributed fertilizer plants."

While the application of existing scientific and technical knowledge to agriculture in the underdeveloped and developing regions could, as the case of Mexico shows, transform the food situation, there is a continuing need of course to carry on fundamental, long-term research.

The key to progress is the enquiring mind, the search after knowledge, the achievement of new triumphs in science and technology. It is the thrust of new ideas and new techniques that is the force of progress. This is as true of agriculture as of industry, of food growing as of food processing.

For example the development of the technique of dry land farming in Canada, the U.S.A., and Australia which called for the design and manufacture of specialized machinery, has opened up the possibilities of productive farming in a wide range of countries throughout the world. It has given realism to hopes and plans for producing more food in such semi-arid countries as Tunisia, Libya, Arabia, Jordan, Saudi Arabia and many others elsewhere.

If the underdeveloped countries are to play their full part in their own development—and such self-help is essential—they too will ultimately have to contribute to research on a scale comparable to that of the technically advanced countries. Of course, research is already being carried out in many of the underdeveloped countries but it is restricted by the limited resources of trained personnel facilities and equipment.

Successful economic and social development of these countries will make it possible for them to join in the costly, complex and highly skilled research programmes which are characteristic of technically advanced countries.

The main problem at the moment, however, is how to apply on as broad a scale as possible existing knowledge and techniques so that food production can be substantially increased season by season and year by year.

First and foremost, we must realize that agriculture cannot be dealt with in isolation from the rest of the economy. It cannot be pulled up by its own boot strings from the bog of tradition, inefficient practices, prejudices, illiteracy and poverty. It is so basic and so linked with all aspects of life in the underdeveloped countries that any plan or programme to increase productivity must be an integral part of an overall development scheme if it is to succeed.

This fact is stark enough when it is realized that 80 per cent or more of the people in these countries live by some sort of farming—mostly subsistence farming, resulting in a life always threatened by serious food shortage, if not famine. It is among these masses of illiterate people, numbered in their millions, that hunger or malnutrition is a life-long affliction.

The prerequisite to any progress is, as I have said, an overall economic and social development plan and in this plan agriculture must be the cornerstone. Such a plan calls for increased investment of capital, materials, services and manpower. While a large part of the capital needed must come from within the country, the various international agencies or countries in a position to offer bilateral assistance or private commercial enterprise must assist to the extent possible and in a growing measure.

Any long-term plan to increase agricultural production involves many sectors of national life and at various levels. For instance, adequate government administrative and extension services must be organized; training and instruction in improved techniques must be provided if the introduction of improved tools and equipment is to be effective; facilities must be made available for the development of improved varieties of seed, the use of more and better fertilizers and for the development of irrigation schemes and so on.

To take action along any of these lines calls for capital investment of one kind or another and for personnel training schemes. This latter requirement is of front rank

CONT'D ON PAGE 14

POLYGON OF THIRST & HUNGER

In northeastern Brazil are some 300,000 square miles of parched land where 23 million people live in constant fear of the periodical droughts and resulting famines which have given the area the name of "polygon of thirst and hunger." Some dates have been burned into the memory of these people: 1877, 1899, 1915, 1957. Worse than the dearth of rainfall is its irregularity. When, as sometimes happens, rains fail to materialize for two or three years running, disaster strikes. Water has to be brought from afar and measured out parsimoniously (left). Herds are wiped out and entire towns go hungry. Below, a farmer contemplates the sun-bleached bones of his cattle. Droughts set off a mass exodus of peopie from the Polygon (right), seeking work on the plantations and in the factories in southern Brazil.

Photos © O Cruzeiro and Manchete, Rio de Janeiro

A literate farmer is a better farmer

importance. Even with capital, equipment and facilities available, little effective progress will be made without trained personnel. It is the lack of such personnel that characterizes underdeveloped countries; therefore, any development plan must take into account the need for training at all levels, particularly, in the first instance, at practical workaday levels.

One of the most valuable of the services provided by FAO and other international organizations has been, and remains, technical training programmes. We have carried out such training in many ways, especially through working parties, seminars and training centres. In most cases these have been essentially practical in instruction.

For instance, some years ago FAO was concerned with the Government of India in setting up training centres to teach illiterate fishermen how to operate and maintain outboard engines, to handle improved types of fishing gear and equipment, and to navigate by compass and chart. In a six months course, 80 per cent of which was practical demonstration, these fishermen were taught to sail to and from fishing grounds far out of sight of land and far beyond the near shore grounds which they had always fished in catamarans and other local craft. The first two of these training centres were so successful that a number of others have been opened up in India.

Instruction in improved techniques, imparting the practical "know how," is the key to all our technical assistance work. Every expert we send into the field has local assistants to work with him. In this way, personnel are trained while the job is being done, with the object of their being able to carry on the work when the expert leaves the country.

Any plan for the economic development of a country must take into account sociological factors, and this is particularly true in the agricultural sector. Farmers and rural dwellers are proverbially conservative people, having very little margin of income to undertake application of new ideas and new techniques, deeply rooted in traditional ways life and embedded in a social structure which resists change and experiment.

As I said earlier, a great majority of them in the underdeveloped and developing countries are subsistence farmers who do not own the patches of land they till and are often in debt. As a result, the poor harvests they reap have to be divided, one part to pay off their debts—or the interest on them—and the other part to live on. Furthermore, even where such farmers are owners of the land, inheritance has resulted in fragmentation of holdings to a point where the area worked is so small that the farmer cannot produce enough food to feed himself and his family throughout the year.

It is obvious that in the circumstances, an essential condition for the development of agriculture is land reform. This is a very complex, intricate and politically difficult question, and one which can only be tackled effectively by the government of the country concerned.

We, in FAO, have been closely concerned with these problems of agrarian reform for many years. Many governments have asked for our advice, and have acted upon it. Even so, the problem remains acute and is of such a nature as to hold back progress. The mere passage of land reform bills is not enough. These must be made effective operationally at all levels, from the government department down to the farmer. Such reform measures are but a start towards tackling the problem.

PROBABLY the only way to overcome the obstacles presented by traditions and prejudices, and the established patterns of life in rural communities, is through education in its broadest sense. Obviously, any effort to introduce new ideas, even in the shape of a useful tool, must be done with sympathy and understanding, if it is to be accepted. And communicating new ideas and techniques is very difficult if only the spoken word can be used, and that just to a limited extent.

Even the most elementary education, that of learning to read and write, smooths the path for people who are trying to introduce new techniques and equipment. It is axiomatic that a literate farmer has a much better chance of understanding a reform and development programme and grasping the opportunities offered than does one who can only rely on his memory to understand and make use of what he has been told.

Thus, the progress of any development plan for agriculture depends to a large extent on overcoming the obstacle of illiteracy. And while practical demonstrations will enable the adults to understand and adopt new techniques, children and the younger generation need to be educated. They learn quickly and it is on them that the pace of future progress depends.

From what I have said it is quite clear that no national or international programme of assistance on the present-day scale is big enough to encompass all that should be done. The problem is too vast to be left entirely to governmental action.

For many years I have lived with this problem and when I became Director-General of FAO in 1956 I became more and more conscious of the fact that all we had done so far through international and bilateral aid was insufficient. I felt that the problem could only be tackled effectively if people everywhere in the world became fully conscious of its nature and magnitude. It was with these ideas in mind that I proposed the "Freedom from Hunger Campaign" so that all men and women and children in all countries could join in the struggle to eliminate hunger.

Clearly we cannot hope to achieve victory in a few years, so this is a struggle which must go on for a generation, even several generations. In order to make that possible it is necessary that people in all countries should be fully informed as to the nature of the task and of its significance to the future well-being of people everywhere.

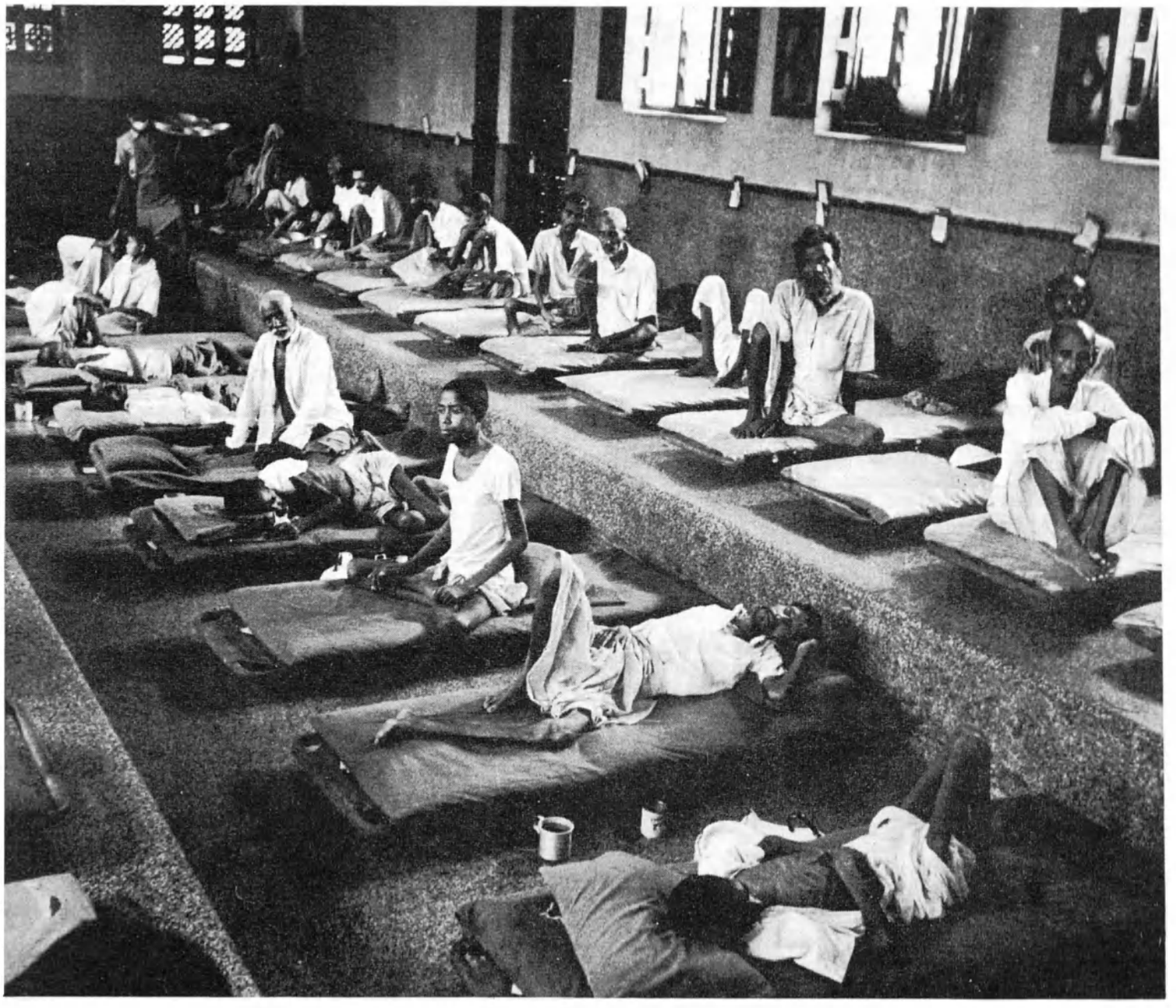
WE ARE ALL EQUALLY RESPONSIBLE

...We should like to express Our sincere appreciation for the highly beneficial work which the United Nations Food and Agriculture Organization is undertaking to establish fruitful accord among nations, to promote the modernization of agriculture especially in countries in the process of development, to alleviate the sufferings of hunger-stricken peoples.

...Mindful of Our role of universal Father, We feel obliged solemnly to stress what We have in another connexion stated: "We are all equally responsible for the undernourished peoples... Therefore, it is necessary to educate one's conscience to the sense of responsibility which weighs upon each and everyone, especially upon those who are more blessed with this world's goods."

POPE JOHN XXIII

Encyclical Letter "Mater et Magistra", May 15, 1961



© Pierre Pittet, Geneva

Their limbs and bodies wasted by starvation, these men were found prostrate in the streets of Calcutta. Here they are being cared for by a charitable organization which has already saved the lives of thousands of people.

FAMINE THE GREATEST SCOURGE OF HISTORY

by Georges Zottola

THE world's earliest record of hunger is a stone. On a stele discovered in a tomb near the First Cataract of the Nile, a Pharoah of Egypt inscribed in granite his cry of despair about the "Lean Years" of famine ravaging his kingdom. Like a warning to posterity, the stele of famine reads:

"From my throne I grieve over this calamity. During my reign the Nile has not been in flood for seven years. Corn is scarce and food is lacking. Men have become thieves and pillage their neighbours. Those who would run cannot even walk. Children cry and the young falter and stagger like old people. Their legs drag or give way under them. Their spirits are broken. The council chamber of the nobles is deserted. The food bins are broken open and empty. It is the end of everything."

Ancient art has bequeathed to us images of hunting and agriculture, music and dance, but it has rarely given a face to hunger. No effort was needed to evoke its features. Down through the ages at the height of terrible

CONT'D ON NEXT PAGE

A haunting picture of death and desolation

epidemics, murderous wars and major disasters it has always been a close companion to man.

Hunger also haunts the pages of the Bible. Like a slow-moving, distant wraith it glides implacably across the pages of Genesis, Exodus and the Book of Kings. The prophet Joel bewailed its appearance in the wake of hordes of locusts in these words:

"Lament like a virgin girded with sackcloth for the husband of her youth... Alas for the day... The seed is rotten under their clods, the garners are laid desolate and the barns are broken down... How do the beasts groan!... Oh Lord, to thee will I cry."

The "daughter of the night," as the Greek poet, Hesiod, called it, figures in all the great events of Antiquity. In the year 440 B.C. the Plebians of Rome, crazed by hunger, threw themselves in multitudes into the Tiber. Ancient Rome had its Lactaria Columna. At the foot of this monument, women, recalling the legend of the female wolf which succoured Romulus and Remus, abandoned the newly-born children they could no longer feed.

The spectral shape of hunger dominates the entire Middle Ages. It drove Attila and his hordes towards the south. It went its furtive way throughout the Hundred Years War. Sometimes, as in 879, 1016 and 1162 A.D. it held the whole of Europe in its grip. People were driven to eating earth mixed with a little flour and baked as a loaf. Animals were bled and men, like vampires, sucked their blood.

In 1190 during the Crusades, beans were sold one by one. The story is told of some crusaders at the siege of St. Jean d'Acre who paid a denier (a French coin, originally of silver) for 13 beans. On their return to camp they discovered that one of the beans had a weevil in it and rushed back to the food merchant to change it for a good one.

Thirteen times in the 16th century and eleven times in the following century, famine gripped France. Writing to Louis XIV, the great French philosopher, François de Fenelon, declared: "From one end to the other, France resembles a huge hospital, desolate and without food."

Hunger was one of the causes of the French Revolution. In 1788, its baleful countenance was seen in the heart of Paris itself, a grim omen of the bloodshed to follow.

Recording the ebb and flow and analyzing the ravages of hunger in France during the second half of the 18th century, Hippolyte Taine, the 19th-century essayist and philosopher, notes: "The Bishop of Chartres found that people were eating grass like sheep, and dying like flies."

Towards the end of the same century, a strange comparison was drawn between famine and plague by a pastor of Zurich, J.H. Waser. He concluded that plague was infinitely preferable to famine.

"The loss of life through plague," he declared, "can be made good in a matter of ten years or so, but the devastations of famine have far more serious consequences... Those who survive it do not fully recover until years later. Those who come safely through an epidemic, however, are

INVOCATIONS TO THE GODS

Since the Neolithic Age when man turned from being a nomadic hunter to become a farmer, wheat, rice and corn have become the basic foods of the majority of the world's peoples. Thus, from time immemorial the cycle of winning these foods from the soil has had religious and ritualistic associations, reflecting man's hope for good harvests and his fear of famine. One belief of ancient Egypt visualized an afterlife in a place where harvests were always plentiful. One of the

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RICE : The Japanese god of rice and of happiness.

© Bulloz

WHEAT : Fragment of Egyptian tomb painting.

carefree and in good fettle. Those who have succumbed have left them a new place to occupy, as well as inheritances, and thus all those who have a mind to get married can now do so."

The historian, Cornelius Walford, agreed when he wrote: "The losses in human life caused by hunger are far greater than all the wars and epidemics put together."

The first deadly blow against hunger was struck by Western Europe at the start of the 19th century—the century of hope. The discovery and development of machinery uprooted agriculture from its age-long lethargy. On the oceans, the majestic but archaic sailing vessels were displaced by aggressive and bustling steamships which were to supply the Old Continent with more foodstuffs than it had ever before possessed.

Floored, but not yet beaten, hunger struck once more, this time in Ireland in 1846 where it killed one million people and drove another million to emigrate. Then it retreated to Eastern Europe and the Far East where, as if seeking its revenge, it produced its greatest ravages of all times.

One hundred million Chinese died of hunger in the 19th century. "No social factor anywhere in the world," noted Josué de Castro, "has ever made its impact on human conduct with a more despotic power than the collective hunger of the lands of the Far East. When a Chinese met a friend, he no longer said "Good-day to you." His first words of greeting were: "Have you eaten?"

The 19th century was also the era of India's most terrible famines. In 1876 alone, hunger wiped out five million people and in the last years of the century twenty million Indians fell victim to famine.

Nineteenth-century Russia traversed 40 years of famine. In 1891, the newspaper, *Russkie Viedomosti,* reported: "From morning till evening, hungry people wander from house to house begging for something to eat. But they return home empty-handed for no one gives anything away at all."

"Traders went the rounds of villages," reported Ilin, "and taking advantage of the famished people, bought up anything they could lay their hands on for next to nothing. Even the bonnets and shawls of old women were pulled out of the family chests and sold. Women sold their hair. A good tress was worth two roubles."

The moujiks survived this hecatomb through a form of "hibernation."

"The peasants practise a kind of artificial winter sleep which they call *ljoschka.* There is no mistaking its resemblance to the ways of hibernating animals. This collective sleep can go on for as much as four or five months and arrangements are made to ensure its duration, not just in the case of a few people, but for entire villages. People simply stay in bed, move as little as possible, and only do what is absolutely essential. They only get up to refuel the fire warming the house."

HUNGER, the issue of natural disasters, did not disappear with the arrival of the 20th century. As an offspring of war, it struck in another guise with even greater fury. Between 1940-1945, from France to Greece and from Holland to Poland and Russia, it crushed Europe beneath its heel.

Only the resources of the black market in food saved millions of French people from conditions like those found in the "death camps." In Belgium, the marks of hunger were written in faces and bodies swollen by the oedema of malnutrition. In the Netherlands, during the terrible winter of 1944-1945, so many people died that there was finally no wood left to make coffins and the bodies had to be stacked in long rows in the churches. The system of exterminating Jewish people by starvation during the last war, as de Castro has emphasized, "caused dozens of times more deaths than the gas chambers and execution squads."

The writer, Boris Shub, has drawn up a striking table of "famine statistics": "In 1941, nearly 50,000 Jews—one-tenth of the population—died in the Warsaw Ghetto. By 1942 the death rate of Jews in Vienna was ten times that of before the War."

But history's most recent great holocaust was not confined to Europe. In 1942-1943 famine gripped Calcutta with such intensity that people died by the thousands and the number of corpses strewn in the streets was so great that their disposal became a critical problem.

In 1945, the physiological processes of acute malnutrition were largely unknown. The "daughter of the night" had always been a subject as taboo as, say, sexual problems. The living-corpses of Bergen-Belsen were free, but still went on dying "because," in the words of a leading British specialist, the late Sir Jack Drummond, "we had no idea how to revive these dying victims of hunger."

Gorged with food, and given injection after injection, the moribund victims simply died twice as quickly. The most effective antidote against malnutrition, it was quickly found, is skim milk given in small quantities.

One of the first scientists to study the question of food in times of famine was Parmentier.

"I know that those who live amid plenty," he wrote in 178I, "cannot imagine that their fellow citizens are deprived of the most basic necessities, nor could they believe that most of the plants which I shall name are often eaten uncooked."

The "Father of the Potato," as Parmentier has been called, then listed thirty-four foodstuffs for times of famine, all of them the roots of wild plants: *Aristolochia rotunda, Astragalus scandens, Cuoumis sylvestris, Arum dracunculis,* etc.

For lack of anything better, people have eaten the roots named by Parmentier and also clover, ferns, acorns, nettle leaves, and the sweepings of grinding mills. Clover, in

CONT'D ON NEXT PAGE

ancient Japanese gods of happiness was also the god of cereals, pictured astride sacks of rice. In pre-Columbian America, the Zapotec Indians made funerary urns in the form of gods associated with agriculture and in particular the maize god.

© Musée de l'Homme, Paris

MAIZE : A Zapotec funerary urn from Mexico.

Driven to eating straw and wood

particular, has saved many millions of starving people.

A Polish botanist, Doctor A. Maurizio, has published a learned work on famine foods of the past. He tells us that roots and wild plants were not the only "hunger-breakers" used. People have eaten tree-bark or, more precisely, a bread made with the bark of pine, elm, birch and beech.

But eating "bark bread" can be dangerous. A Russian traveller, J. Beckmann, describing a famine that occurred in 1769, reported that children became weaker more quickly than adults on this diet. Yet even adults, after eating the bread for several days, developed such badly swollen feet that they could no longer walk. Bark bread is by no means the most extreme remedy for hunger. Famine-stricken people have used—especially in northern Europe—flour wood and shavings.

Doctor Maurizio explains how it was made. "First wood was dried in the sun or in an oven. Repeated heating makes the wood easier to grind and more digestible. Cooked with yeast added, it produces bread which, it is said, tastes better than that made with clover." The trees used for making such wood bread were the maple, the poplar, the lime, the birch and the elm.

Chopped up and ground straw was also resorted to in the past. During a famine which occurred in Sweden in 1813 people actually ate the straw from their mattresses.

Dr. Maurizio tells us that "straw flour was mixed with rye flour and bonemeal." In western Gotland, even dried cow-dung was reportedly used.

Grim facts like these not only belong to eras long past; they are also close to our own times. Famine still cleaves its deadly way amid the great political and social upheavals of our day, as in India and Pakistan between 1946 and 1948, when the partition of the two countries caused the biggest migration in history, and nearly 12 million refugees flowed between the two countries. It struck again during the recent events in the Congo. Catastrophes of nature, like the great drought from 1951 to 1953 in Brazil's "Polygon of Drought," also continue to claim innumerable victims.

A History of Hunger would be the greatest book on world history ever written.

Based on a chapter from "La Faim, La Soif et Les Hommes" (Hunger, Thirst & Men) by Georges Zottola, published by Hachette, Paris, 1960.

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THIN AS RAKES & FAT AS HOGS

In the 16th cent. Pieter Breughel the Elder pictured with mordant skill an age-old human injustice in these engravings of the lean and hungry and the fat and overfed.

HUMILIATION

The one thing to which a man can never become inured is humiliation. Hunger becomes unbearable when it is linked in men's minds with humiliation. If, in recent years, hunger has become a dangerously explosive problem, it is because men who look on it as a form of humiliation have become ever more numerous. Thus, the basic question we must ask ourselves is not why, in the mid-twentieth century, hunger is now the central problem of our planet, but, more exactly, why at this time hundreds of millions of people have come to think of their hunger as an intolerable humiliation.

TIBOR MENDE

Speaking at the " Rencontres Internationales de Genève ", 1960.

HIDDEN HUNGER

by Prof. Michel Cépède
National Agronomy Institute, Paris

The term malnutrition can be defined as the result of a diet which does not provide the right kind of food for good health, for the normal development of children and adolescents, nor for normal activity at all ages of life, The chief form of malnutrition is under-nutrition which is a deficiency of the vital nutrients in the food one eats. Malnutrition resulting from eating too much of these nutrients is also known to exist but it is extremely rare and does not even remotely have the social significance of hunger, that is, under-nutrition.

To maintain that two persons out of three in the world still suffer from hunger, as was once done in the past and is still done by a number of people, including myself, it is necessary to abandon the simple notion that the level of food consumption is measured merely by the number of calories present in the daily food eaten by each person.

When at the end of the 18th century Lavoisier showed the analogy that existed between living matter and combustion, he pioneered the idea that food was the body's combustion agent or fuel and introduced quantitative analysis into the study of what happens to the food we eat. His successors were thus able to calculate the number of calories required by the human body to sustain life.

Man's minimum calorie needs are very strictly defined. Specialists of the subject agree (with variations of some 100 calories) that 2,200 calories are the minimum requirement for the average adult at rest, depending on height, weight, etc. With this as a basis, even the most optimistic authorities admit that 10 to 15 per cent of the world's population (excluding mainland China) is undernourished.

The first survey of the world food situation undertaken between the years 1934 and 1938, the results of which were published by FAO in 1946, revealed that average daily calorie consumption was less than 2,250 in countries totalling more than half the world's population, between 2,250 and 2,750 calories for one-sixth of the earth's inhabitants, and over 2,750 calories for only a little less than one-third of the population of our planet.

The more optimistic figures of 10 to 15 per cent cited above were arrived at long after the first world food survey, but can be accounted for by the fact that first, mainland China is no longer included in United Nations statistics, and second, food needs calculated on the amount eaten (intake) are often confused with the food actually available (bought at the retail level). At the indispensable minimum level of calorie needs, the difference is in the order of 100 calories, a figure which can hardly be disregarded.

In some cases economists have even based their calculations on gross food production figures, thereby ignoring food losses as well as those food products not consumed but used for other purposes. Statements of the kind made in *The World's Food*, published in 1954 by M.K. Bennett who determined dietary needs in terms of "calorific equivalents in cereals" must be judged in the light of these remarks if we are to avoid the same hasty conclusions that led the English economist Colin Clark to deny the very existence of undernourishment and hence hunger itself.

Moreover, calculations based on the average availability of food actually conceal an extremely important aspect of the problem, since even in countries where enough food is available there are those who have more and consequently others (usually more numerous) who do not have enough. The late John D. Black of Harvard University once estimated that even in the United States 25 per cent of the population was overfed, 42 per cent well fed, and 33 per cent underfed.

With these observations in mind, I do not hesitate to state that for the total population of the earth more than one-third and no doubt nearly one-half of mankind suffers from under-nutrition due to lack of calories, that is, hunger in the strictest sense of the word.

Unfortunately, calorie deficiency is not the only form of undernourishment. In cases where attempts were made in the past to feed populations cheaply on a diet limited to low-priced calories, chiefly in the form of cereals and especially roots and tubers i.e. foods with a high starch content (such as manioc, taro, plantains, yams and potatoes) it was soon discovered that serious illnesses inevitably resulted. Josué de Castro has coined the appropriate phrase "specific hunger" for such ailments.

To operate the human machine, fuels (in other words calories) are not enough. Many chemical nutrients used up by the body have to be replaced, and these must come from the food we eat. Such nutrients have to be supplied to the body in particular forms, for as the great French nutritionist André Mayer put it some time before his death, "man is an imperfect chemist."

Certain plants are able to convert minerals into food, and there are animals which can derive essential vitamins and certain proteins from other forms of food. Man's chemistry, however, is even more imperfect than that of many animals. Consequently our bodies require more than just a certain number of calories to save us from malnutrition or "specific hunger."

The first specific hungers man came to know about were the protein deficiencies (or at least a number of them), mineral deficiencies such as calcium and phosphorous, and above all the vitamin deficiencies. Extreme cases of such deficiencies have been studied in spectacular diseases like scurvy, pellagra, beri-beri and rickets and have been found to vanish almost miraculously when diets were modified. And it is well-known how vitamin-conscious people were in the first quarter of the present century.

Only in more recent years has it been discovered that

There is no unanimity even among experts as to the proportion of the world's people who suffer from hunger since there is no internationally accepted yardstick for measuring "hunger". A number of years ago FAO advanced the figure of two-thirds of humanity but has since lowered this as Dr. Sen's article on page 7 indicates. Professeur Cépède, of the FAO Council and a world authority on nutrition, here explains why, in his opinion, the first FAO figure still holds true.

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The history of China is a history of hunger. Over a period of 2,000 years it has experienced no less than 1,829 great famines. Today most of Asía's people are still undernourished and their health and working ability impaired by malnutrition—the "hidden hunger" caused by diet deficiences.

long before these diseases actually appear specific under-nutrition saps health and working capacity to such an extent that the whole life of the individual suffering from specific hunger is seriously impaired.

What is true for the average adult applies with even greater force to those who must not only feed their bodies but need extra nourishment to promote growth. Expectant and nursing mothers, children and adolescents are particularly vulnerable to the various forms of specific hunger.

As early as 1936, Lord Boyd Orr in his book *Food, Health and Income*, which still stands as the first authoritative work on the economics of food, used the example of Great Britain to show that only the expensive foods made it possible to avoid the specific hungers and their consequences.

We may well ask therefore if specific hunger is merely a qualitative problem, or to put it slightly differently, if all one has to do to ensure that mankind is well fed is to inform people what types of food should go into every person's daily diet of say 2,500 calories. As Lord Boyd Orr has pointed out, such a diet is more expensive and it is precisely the poor sections of society and the impoverished nations more than the others who are the real victims of specific hunger.

Agronomists have added a new factor whereby the specific hungers can be re-appraised globally just as caloric under-nutrition was re-calculated. For if the food products which are essential to a proper diet are sold at a higher price than those which simply provide energy (calories) then it is obvious that the former mean far more in terms of "agricultural production" than the latter.

One of the most serious of the specific hungers, affecting chiefly the more vulnerable sections of the world's population, can be overcome only by certain protein products such as milk, eggs, meat and fish. Most of these are not obtained directly from agriculture since each acre of land

CONT'D ON NEXT PAGE

THE SAME CHILD AFTER 10 MONTHS

When Molok, a little Iranian girl four months old, was brought into a foundling home in Teheran, she weighed less than seven pounds (left). A pitiful sight, with her skinny limbs and swollen belly, she was in an advanced stage of malnutrition. Ten months later (right) thanks to proper food, careful nursing and hygienic conditions she had fully recovered and was nine pounds heavier. The home where Molok was cared for was started by a British woman specialist sent to Iran by FAO to advise on school feeding programmes. Over a period of 18 months it took in 132 children and managed to save the lives of 100. But for every child as lucky as Molok, there are also countless thousands who do not survive.

Public Health Dept., Iran

The earth is not overpopulated—it can feed 10 times the present number

must first furnish the required vegetation which in turn is consumed by the animals that provide us with the protein food. The fact is, however, that the yield of such a process is extremely low, so that one calorie of grass or grain does not produce one calorie of milk or meat.

The first world survey proposed as a conservative coefficient the consumption of seven initial (or vegetable) calories for the production of one calorie of animal product. Since then we have used this ratio which offers a satisfactory scale, far superior at any rate to the ones which calculate food level in terms of final calories consumed, or of calorific equivalents in cereals which amounts to the same thing (1).

On this basis we can indicate that if the daily diet of an undernourished person is made up for instance of 1,700 calories of plant foods and 100 calories of animal products, this represents $1,700 + (100 \times 7) = 2,400$ "initial calories." Similarly, if a properly nourished person consumes 2,000 calories of plant foods and 1,200 of animal products daily, this represents $2,000 + (1,200 \times 7) = 10,400$ "initial calories". In terms of agricultural production the second diet is 4.5 times greater than the first although in "calorific equivalents" it is only 1.75 times greater.

Thus while we have pointed out that it is incorrect to assume that a diet composed of an adequate number of calories is a guarantee of proper nourishment, we can now state that a diet composed of an adequate number of "vegetable or initial calories" does meet man's "specific" needs as a general rule. But of course the figure of 2,200 "intake" calories is no longer applicable as the minimum requirement when speaking of initial calories; the true figure is more like 6,000 initial calories for an average person, allowing for the special needs of children, adolescents and expectant and nursing mothers. In fact as early as 1953 we estimated that the per capita daily diet for Egypt and France ought to be 5,850 and 5,804 "initial" calories respectively.

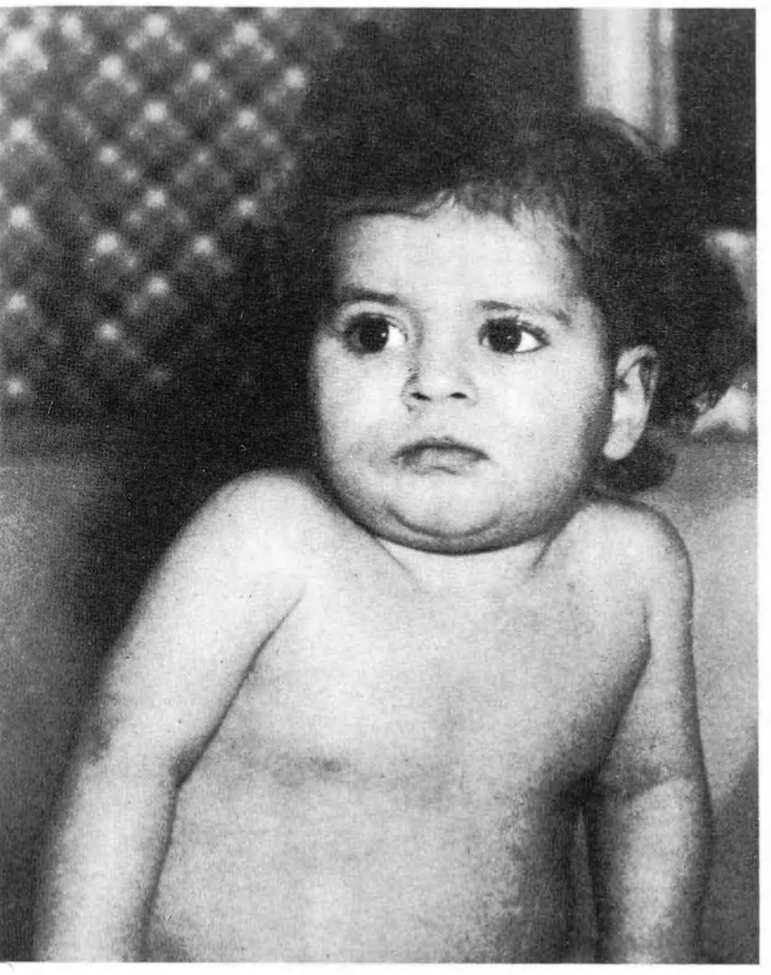
The first world food survey showed that the average level of food consumption in Egypt was 2,100 "final" calories and 3,000 "initial" calories. The figures given for France for both types of calorie calculations were 3,012 and 6,160. A diet of 5,800 vegetable calories would correspond to a diet of 2,200 calories of which 600 came from animal protein products.

On the basis of these calculations we easily arrive once again at the figure that the nutritionists of FAO and particularly Lord Boyd Orr advanced in 1946 to the effect that two persons out of three suffer from hunger, that is, from malnutrition through caloric under-nutrition and/or specific under-nutrition. This figure was reached by a series of estimations based on an analysis of the first world food survey—and not as a result of a simple mathematical error as M. K. Bennett believed in 1954 and Colin Clark and many others still maintain.

A diet made up almost exclusively of plant foods, despite the statement that it satisfies human needs expressed in terms of "calorific equivalents in cereals" not only is "monotonous and uniform" but cannot possibly meet "the physiological requirements of the human body." And those persons whose diet consists only of such food "truly suffer from hunger." Both Lord Boyd Orr and Josué de Castro are nutritionists and food physiologists, and their affirmations were based not merely on statistics but on factors visible to anyone who observes how man lives.

No doubt tomorrow may see new "advances" made by science so that some of the nutrients now found only in animal products may one day be available, perhaps even more cheaply, in cereal or synthetic foods. A number of

(1) *M. Cépède and M. Lengelle, "Economie alimentaire du globe"* (1953).



results have already been achieved with food preparations for certain animals such as pigs whose nutritional physiology does not differ markedly from man's, and the experiments being carried out look promising.

But the many catastrophic attempts to feed people cheaply which have marked the development of the science of nutrition since the time of Lavoisier should incline us to caution. Yet despite these failures there is room for hope.

It is one thing, however, to have faith in the progress of science and technology and quite another to claim that mankind already has enough to eat.

And it is quite another thing too to pretend that the earth is now overpopulated or that it will become so when our planet contains six to ten thousand million people.

The fact that our present world population of 3,000 million does not get enough to eat, that two persons out of three live face to face with hunger, does not mean that we are incapable of feeding twice this number properly and adequately. Colin Clark has written : "If we consider a diet based on cereals we could have a total population of 90,000 million."

Let us assume that his calculations are correct (2) and merely rectify the basic error taken from M. K. Bennett by adding animal products to the requisite diet. This reduces his figure of 90,000 million people to about 35,000 million who could be properly fed on the basis of our present level of scientific knowledge. And this figure is by no means a maximum, especially if we look ahead to the future.

But this is precisely the scandalous situation of our time and one which it is useless to seek to disguise: that in a world capable of properly feeding 35,000 million human beings and containing only 3,000 million, at least 2,000 million suffer from hunger.

(2) *These are based on a harvest of just over* 1-2 *tons of grain equivalents for each of the* 17,300 *million acres of the world's recognized arable lands.*

Particularly since one of the consequences of malnutrition is malnutrition itself. For malnutrition ruins man's health and impairs his ability to work. Proper food is not simply a goal of, but a factor in, economic development (3). As Albert Sarraut has rightly pointed out, in too many countries the inhabitants "are undernourished because they do not work and they do not work because they are undernourished."

It is not possible here to refer to the many lengthy studies which show the relationship which exists between food, health and working productivity. Let me simply recall one experiment carried out in Costa Rica during the construction of the first Pan American Highway. The men working on the highway had a very low output when their diet consisted chiefly of sugar cane—which gave them the requisite calories intake. When this diet was changed and they were properly fed, it was found that their output improved to such an extent that it equalled the standards of workmen in the temperate climates of Western countries (4).

This experiment was so spectacular in its results that the Costa Rican section of the Pan American Highway has come to be known as "The Road That Food Built."

But the food needs of adults or even workmen are not our most urgent problem today. The malnutrition of expectant and nursing mothers, of children and adolescents, has far more serious consequences on a nation's health and the capacity to feed its inhabitants and achieve economic development.

MUCH has been said and written about the rise in the expectancy of life in modern times, but the individual who has already reached adulthood does not have a much higher life expectancy whether he is well fed or poorly fed. For although diet does condition the adult's working productivity it is no longer the overriding factor of adult health, provided of course that the body has the strict caloric minimum required of living.

The situation is totally different, however, as regards the body of a growing child or an expectant mother. The eminent French pediatrician, Professor Robert Debré, has pointed out that the sudden deficiency of animal protein which strikes children in the undernourished countries when they cease to be breast fed and are deprived of their mother's milk, is without a doubt the most serious of all the diseases which afflict mankind.

This disease of malnutrition, the acutest forms of which have all been given the common name "kwashiorkor", often attacks eight children out of ten and is responsible for the higher death rate observed in these countries. But above all it cripples the children who manage to survive, and for the rest of their lives (which may be quite long) they remain physically impaired and unable to provide the necessary food either for themselves or their family.

To feed the adults of today and especially the men and women of tomorrow, means putting mankind in condition to feed itself better, it means breaking the vicious cycle referred to by A. Sarraut; it means launching a process of development so that tomorrow, if we so will it, we shall no longer have two persons out of three suffering from hunger as we do today even if in the meantime the population of the earth does double—or even multiplies ten times.

It is not by denying the tragic realities of today that mankind will be deprived of its oldest enemy, hunger, but by facing up to these realities squarely and honestly and recognizing that they are the scandal of our time for which ignorance is responsible and not the ungenerosity of nature or the number of people on earth—ignorance and problems of economics... For if two people out of three suffer from hunger, perhaps the economist should tell us why.

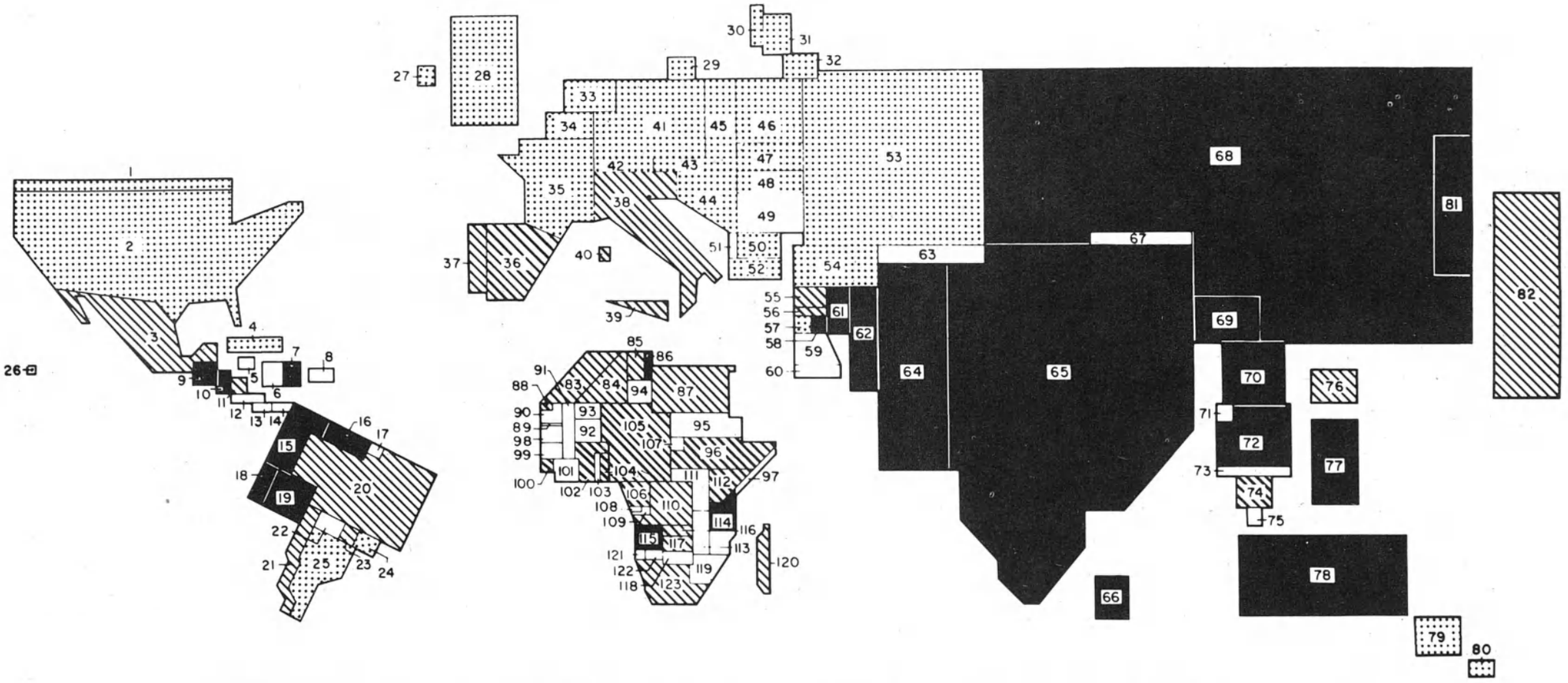
(3) *M. Cépède "Food as a Production Factor": Indian Journal of Agricultural Economics.* 1959.

(4) *Between* 1943, *when* 70 *per cent, and January* 1946, *when* 88 *per cent of the workmen were Costa Ricans, daily output per man rose from* 313 *cubic yards to* 1,440 *cubic yards.*

FOOD AND POPULATION

Distribution of the population of the world according to daily intake of calories

Size of country in proportion to population

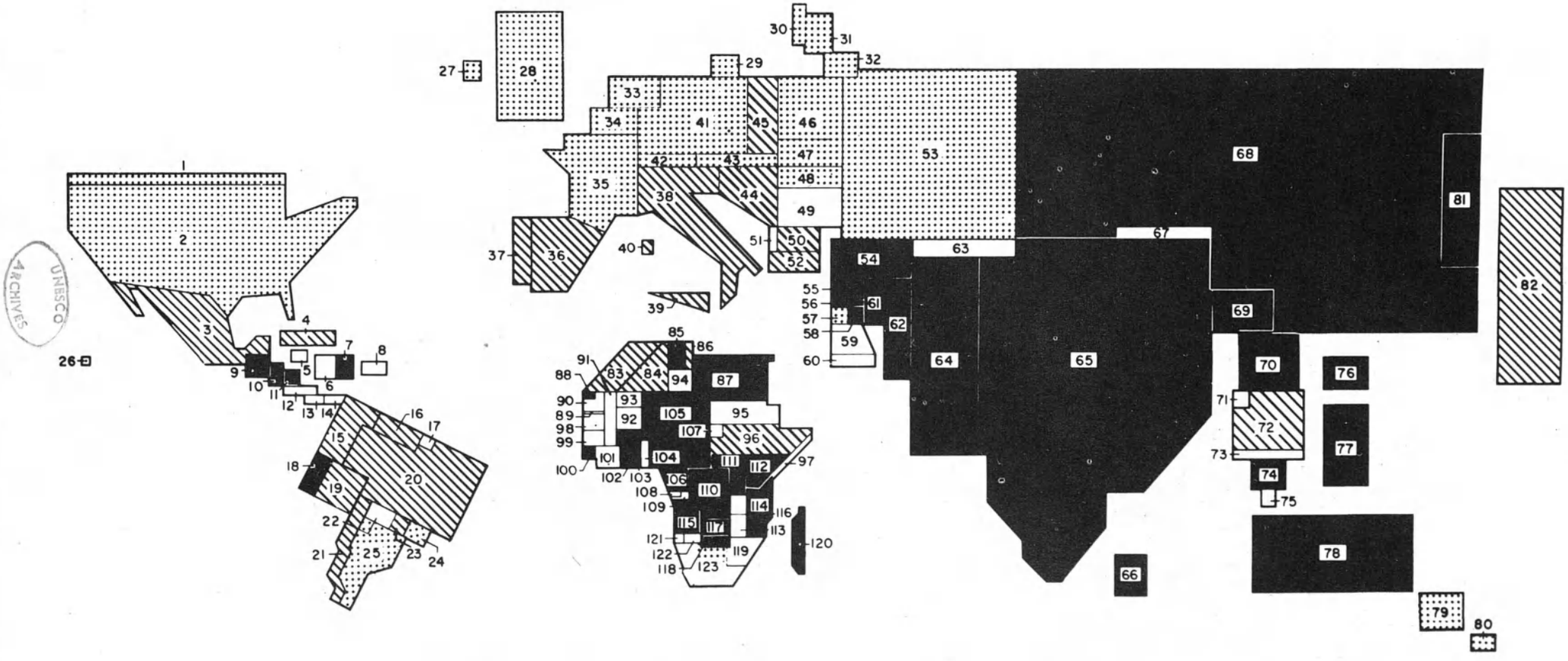


1. Canada
2. United States
3. Mexico
4. Cuba
5. Jamaica
6. Haiti
7. Dominican Republic
8. Puerto Rico
9. Guatemala
22. Bolivia
23. Paraguay
24. Uruguay
25. Argentina
26. Hawaii
27. Ireland
28. United Kingdom
29. Denmark
30. Norway
43. Austria
44. Yugoslavia
45. Eastern Germany
46. Poland
47. Czechoslovakia
48. Hungary
49. Rumania
50. Bulgaria
51. Albania
64. Pakistan
65. India
66. Ceylon
67. Nepal
68. China, Mainland
69. Burma
70. Thailand
71. Laos
72. Viet-Nam & N. Viet-Nam
85. Tunisia
86. Libya
87. United Arab Republic
88. Mauritania
89. Gambia
90. Senegal
91. Mali
92. Upper Volta
93. Niger
106. Cameroun
107. Central African Republic
108. Gabon
109. Congo - Brazzaville
110. Congo - Leopoldville
111. Uganda
112. Kenya
113. Ruanda-Urundi

10. El Salvador
11. Honduras
12. Nicaragua
13. Costa Rica
14. Panama
15. Colombia
16. Venezuela
16. Guianas
18. Ecuador
19. Peru
20. Brazil
21. Chile
31. Sweden
32. Finland
33. Netherlands
34. Belgium
35. France
36. Spain
37. Portugal
38. Italy
39. Sicily
40. Sardinia
41. Fed. Rep. of Germany
42. Switzerland
52. Greece
53. U.S.S.R.
54. Turkey
55. Syria
56. Lebanon
57. Israel
58. Jordan
59. Saudi Arabia
60. Yemen
61. Iraq
62. Iran
63. Afghanistan
73. Cambodia
74. Fed. of Malaya
75. Singapore
76. China, Taiwan
77. Philippines
78. Indonesia
79. Australia
80. New Zealand
81. Korea & N. Korea
82. Japan
83. Morocco
84. Algeria & Sahara
94. Chad
95. Sudan
96. Ethiopia
97. Somalia
98. Guinea
99. Sierra Leone
100. Liberia
101. Ivory Coast
102. Ghana
103. Togo
104. Dahomey
105. Nigeria
114. Tanganyika
115. Angola
116. N. Rhodesia
117. S. Rhodesia
118. Nyasaland
119. Mozambique
120. Madagascar
121. S.W. Africa
122. Bechuanaland
122. Basutoland
122. Swaziland
123. South Africa

Distribution of the population of the world according to daily intake of animal protein

Size of country in proportion to population



UNESCO ARCHIVES

FOOD TABOOS ALLY OF HUNGER

by Dr. Marcel Autret

Director, Nutrition Division, FAO

A FISH FARMER'S HARVEST

Encouraged by their state government and with help from FAO and UNICEF, the villagers of Orissa, India, have become fish farmers. This extensive programme of pisciculture was decided on when nutrition surveys revealed a high incidence of protein malnutrition among the people of Orissa. Harvests from the village fish ponds will help to compensate for the lack of animal protein in present diets.

Photo Jacques Ling - UNICEF

"Love and hunger lead the world," observed Maxim Gorki, echoing Anatole France not long before and Hesiod some twenty-seven centuries earlier. "Hunger and sex are the two biological finalities which govern Man's social life," wrote Audrey Richards in her study of the Bantus in 1932. Among African peasants or Bolivian workers with extremely low incomes, food accounts for 80 per cent of the family budget. This, moreover, only provides a bare subsistence allowance. Among the North Americans or Western Europeans, from 25 to 40 per cent of the family budget is still devoted to food.

As Professor A. Mayer has noted, three-quarters of the world's population works to produce its food and the remainder works in order to purchase it. Thus, all the progress made in science and technique has been unable to free man from this harsh necessity and has merely succeeded in reducing the effort involved in seeking his "daily bread" and ensuring a diversity of food production to meet the increasingly varied tastes of an increasingly large number of increasingly demanding consumers.

Food habits are an integral part of any culture. Initially, no doubt, they were imposed by the environment and limited to whatever could be gathered in that environment; from huntsmen, the nomads, having tamed wild animals, became first of all pastoralists and then, having learnt to plant and look after cropbearing seeds, developed into settled agriculturalists.

Through habit and physiological adaptation, men acquired a taste for the basic foodstuffs produced in this way. Depending on the regions and the ecological conditions, man's diet was to be almost solely composed of meat (Eskimos), or milk products (the Masai) or of items almost wholly vegetable in origin (Indians, Mayas, Bantus and Asian peoples) while other groups, more favoured by nature or more ingenious, were to be omnivorous.

From the outset, therefore, diet was subject to the limitations of production. This latter was subsequently improved by a technique which was acquired and ceaselessly perfected and, depending on the regions concerned, created the restrictive framework within which emerged the various dietary types.

But economic determinism stops there. Before long, through an uninterrupted process, man—a biological being endowed with the sense of observation and with a memory —in the course of an empirical operation covering thousands of years and often at the cost of experiences for which he paid dearly, selected from the animal and vegetable species those which proved good for him, for his health, his taste, his strength or his well-being.

All of this was accompanied by the intrusion of innumerable spiritual, social and cultural obligations, created by man himself and, unfortunately, always restrictive in nature and by the development of certain acquired and possibly transmittable preferences. In the long run, this choice—whether freely made or imposed—created the dietary habits which are now part of a way of life and one of the aspects of each culture. To parody a famous remark, we might almost say, "Tell me what you eat and I will tell you who you are."

Today, of course, preservation and transport methods encourage economic exchanges; the French get bananas from the Ivory Coast and peanuts from Senegal with oil which can be used in place of butter or olive oil; the Senegalese receive rice from Viet-Nam, the Ghanaians wheat from Canada, the Europeans cocoa from Africa and coffee from Brazil; these are important innovations but they are none the less minor in the sense that they do not change the dietary type.

Dietary habits range from the most extreme simplicity to the most infinite variety. From the nomadic herdsman of Mauritania devoted to his camel milk to the Mexican with his taste for "tortillas" made of corn, beans and fiery peppers, from the Batéké of the Congo who eats manioc with palm oil and the Ouolof of Senegal who eats millet with peanut oil sauce to the Asian with his preference for rice with fish sauce, three-quarters of mankind in essence only know one dish: the basic food—rice, wheat, corn, millet, sorghum, manioc, taro, yams or plantains—and a sauce ranging from clear broth with a little pepper and salt to a mixture of everything which the housewife has been able to lay hands on: oils, fats, vegetables, meat or fish.

It is in the remaining quarter of the world that we mostly find the sequence of varied dishes, the elaborate sauces, the heavy foods ranging from the Roman banquets to the gargantuan repasts dear to Bruegel the Elder, from the solid, down-to-earth meals provided at country weddings to the subtle blendings which skilled master cooks once set before selected initiates.

"Those who go on eating when their stomachs are full" will one day have to learn not to "dig their graves with their teeth," as the Turkish proverb puts it. But it is not with them that we are concerned today. It is not over-eating but under-nourishment and deficiency malnutrition, hunger in short, that we must combat first and foremost.

As a cause of under-nourishment and, still more, malnutrition, that responsibility is a heavy one. However limited food resources may be, man is far from making the best use of them. All sorts of prohibitions and taboos, innumerable beliefs or mere tradition govern the use or non-use of foodstuffs; dietary prohibitions vary according to the clan, the family and the individual; age, the physiological condition and the season of the year; days, associations with the products concerned and methods of killing, transport, harvesting, storing, cooking; the types of cooking implements, etc.

This complexity of taboos undoubtedly derives from many factors: empirical observation, protection of the individual or more generally of the community, equal or preferential sharing of resources, a concern with the preservation of natural resources of the perpetuation of species, abstention because of ignorance, health considerations or caution, purifying fasts, propitiatory abstinence, hoarding (or wasting) for reasons of prestige.

All of them are causes which may be readily perceived. Some are readily accepted by our reason, and others, for which no scientific explanation has yet been found, we accordingly classify as "magical," forgetting that the difference between the magic which replaces science among primitive peoples and our own "science" is only one of time and degree.

Certain dietary practices whose reasons are lost in the mists of time, however, are no longer justified today. If they are harmless from the viewpoint of health or economics, let us respect them—by which I mean, let us leave them alone. If they are harmful from a nutritional or economic viewpoint, let us study them in co-operation with the ethnologist or the sociologist and try either to change them or to make better use of them. Bernard Shaw's remark is to the point: "Facing the past, hats off; facing the future, sleeves up." Faced with the diversity of dietary habits, rites and taboos, we have all too many illustrations for our purpose.

Dietary prohibitions apply particularly to meat, eggs, fish and milk. They extend to absolute or temporary prohibition among pregnant women, nursing mothers, young children and adolescents, precisely those whose need of such protein foods is increased. Thus, in many regions, a pregnant woman may not eat meat of any kind, wart-hog, antelope, rat, snake, chicken or turkey; elsewhere, she may not eat fish. A young child must only consume its mother's milk or light gruels made with the predominant food which, depending on the region, may be corn, millet, wheat, rice or manioc. Neither eggs nor fish; no meat or "hot" foods, no fruits—guava, paw-paw— "cold" foods.

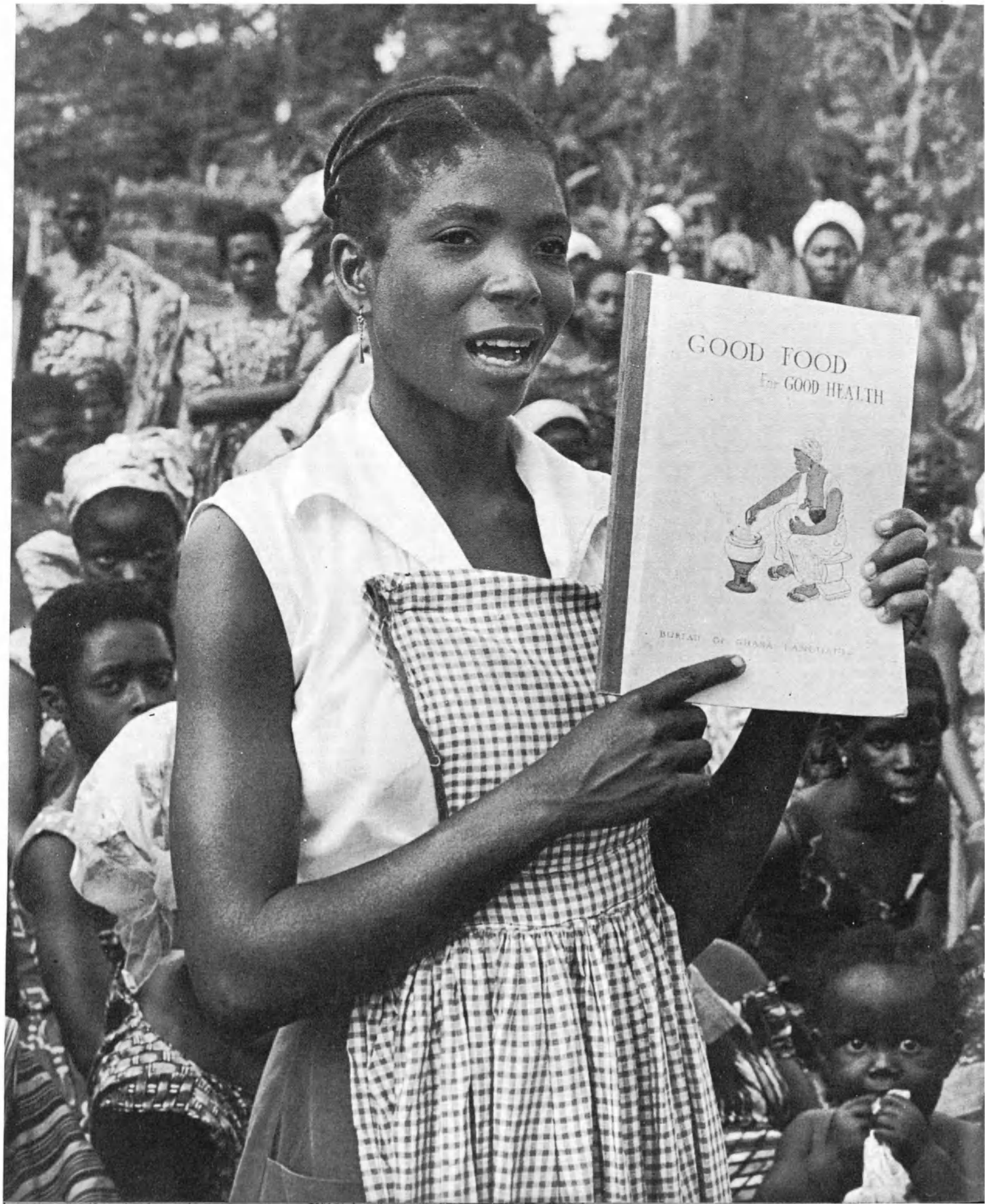
The reasons given for this today are as unconvincing for us as they are essential for many different peoples: milk causes sterility in women, eggs lead to the disappearance of the libido; certain meats have a harmful effect on children; fish can cause leprosy, mottled beans or speckled bananas cause smallpox; a number of foods provoke digestive disturbances, eye trouble, intestinal worms or other more mysterious dangers!

It is not surprising, therefore, that mothers very quickly suffer from serious anaemia and vitamin deficiency (beriberi) and that children are often born with latent deficiencies which, in conjunction with the deficient weaning diet, lead to Kwashiorkor, a protein deficiency illness

CONT'D ON PAGE 30

AFRICAN RECIPES FOR HEALTHIER MEALS

Like many other countries Ghana suffers from malnutrition despite its rich harvests. Though a land of plenty, certain areas, have near-starvation conditions. Much of the nation lives on a basic diet of grains or starchy roots. The biggest deficiencies are meat, milk, fish and eggs. The Ghana Government recently launched a nationwide campaign to teach healthier eating habits and combat food taboos with the help of FAO and Unesco. Results of village-to-village enquiries (right) to survey the situation and discover appropriate recipes already used, were then gathered together into nutrition-recipe book, "Good Food for Good Health", (1959) followed by a children's book, "The Story of the Six Food Families", both edited by Miss Ella Griffin of Unesco. Below, a nutrition course in a Ghana village; and recipe class (below right).



Photos © P. Almasy

Divorced for eating an egg

which haunts children in underdeveloped countries and which has a name in virtually every language. Nor is it surprising that there should be deficiencies of vitamin A which often lead to blindness and numerous vitamin B deficiencies (infantile beri-beri, pellagra, ariboflavinosis) which, when they do not themselves kill, prepare the way for infections which frequently prove mortal.

Whereas the infant death rate in Western countries is between 10 and 30 per 1,000*, it is between 100 and 300 in under-developed countries. Still more striking is the comparison between death rates among children from 1 to 4 years of age where it is recognized that the nutritional factor is a primordial cause, directly or indirectly, of death. In this age group, for each child that dies in Sweden or France, 4 die in Portugal—but 24 in India and 50 in Africa.

This is partly due to poor conditions of hygiene, to poverty; to a much greater extent it is due to ignorance, to traditions, to taboos which prevent the best use from being made of necessary and often available foods. The surveys carried out in Guatemala, Mexico, Nigeria and India reveal that, even in families with a satisfactory food consumption, young children only rarely receive the share which they require. Mothers, thinking they are doing the right thing or from fear of doing the wrong thing, systematically exclude all protein foods from the child's diet up to the age of two years with the exception of mother's milk which is notoriously inadequate.

It should, moreover, be noted that it is in this delicate and dangerous field of weaning that dietary habits are most conservative. Thus mothers in Haiti, where the essence of African cooking has been submerged under the Caribbean, Spanish or French influence, still use akassan and kenke to feed young children. These corn gruels, although carefully prepared, have remained identical with the formula brought two or three centuries earlier from Dahomey or Ghana where they are still used today.

It is essential that this should change, that there should be a better distribution of food within the family, that better use should be made of local products. And this necessitates educating the mother of families.

An example of another kind is provided by the pastoral peoples of Africa. The Masais of Kenya, the Moors of the western Sahara and the Bororos of Central Africa are proud of their herds, the value of which is calculated by the number of head in a given herd. The larger the herd, the greater the prestige and the higher the social standing of the owner. Among primitive and developed peoples alike, pride is another of the motives underlying man's actions, to be added to hunger, love or hatred. So these herds are not exploited and at most a few animals may be taken from them to form a dowry, to acquire a wife or to pay taxes.

One day, none the less, cattle must be commercialized and this will involve establishing the deep reasons which link the man to his herd: survival of the worship of the cow, affection for preferred companions, an ultimate form of saving or sheer pride of possession. In the latter case, the time is not far off when the herds will be weighed against other forms of prestige since, as the anthropologist Lowrie has observed, "man is more a peacock than a biological or economic animal."

In any case, education of the stock-breeders will consist of showing him that there are other pleasures besides contemplating a herd, that there are other forms of exploitation which are more enriching and—why not, if it is in the interest of the community to have the hitherto unused meat or milk commercialized?—that there are other forms of prestige to be offered to the peacock.

Or let us take another example of poor food utilization. In a region of West Africa, the butter sold by the Peuhls is made into soap with the result that Mobas and Gourmas women suffering from vitamin A deficiency wash their clothes with soap containing vitamins.

Other dietary habits are of relatively recent origin and are no less regrettable. An example is provided by the consumption of tea and loaf sugar among certain Mediterranean peoples. Today, Morocco consumes more than 40 kilogrammes of sugar per inhabitant per year, i.e. more than 110 grammes per day, to sugar mint tea. This is a level of consumption comparable to that of countries with ten times as high an income. To give an idea of the cost of this practice, it is enough to mention that tea and sugar absorb two months salary in the average Moroccan family! Such expenditure, even allowing for the social significance and the stimulant effect of this national drink, could be considerably reduced.

Will we one day be able to change these unsound dietary practices? Combat the taboos, the false beliefs, make rational use of available resources? Make it possible for the Indonesian baby to be given fish and the African peanut flour, for the young girls of Uganda to be given milk and pregnant women various meats and eggs? Undoubtedly, yes. With few exceptions, dietary habits only seem static when observed over a short period.

There are abundant examples of evolutions which, in some places, even resemble revolutions. Is it necessary to recall the history of the potato? Do not we Europeans owe to the Crusaders many of the fruits of the Near East, does not Africa owe to the Portuguese corn, manioc, tomatoes, sweet potatoes, to mention only the main items which originally came from South America?

When we measure the place which these products today occupy in African agriculture, it is astonishing to note the changes which have occurred in three or four centuries. And today, before our very eyes, the advance continues: the area given over to the growing of manioc, for example, is increasing dangerously at the expense of cereals, even in regions where the treatment required by the bitter manioc obliges the housewife to cover long distances in order to get to streams where it can be steeped. Similarly, bread consumption in Africa is rising very rapidly. This is simultaneously the result of urbanization and new habits acquired during the war by African soldiers. Some form of spaghetti, with or without tomatoes, constitutes the evening meal in almost every Libyan family—a practice which certainly did not exist before the Italian occupation.

If you ask the girls of Gazaya College, near Kampala in Uganda, who drink milk every day and eat fish, whether they are not afraid of becoming sterile, they will tell you that those are old wives' tales which they have not believed for a long time past, even if, in fact, some of them still have to make a certain effort "to do as the others do" and even if their fears have only recently disappeared. In the centre of the Congo, near Kikwitt, a milk distribution programme was organized in 1952. In less than a year, mothers who had only taken milk for their young children and the boys, began to take it for themselves and their little girls.

And where, a mere fifty years ago, a husband could repudiate his wife and claim the cattle given as a dowry if he discovered that his wife had eaten eggs, chicken raising is now rapidly developing. (But it is not so long ago, in certain farms which I know in France, that the boys could only have chicken, at the price of a good hiding, when they "sacrificed" a bird and the only eggs they had were those they "pinched" from the nest.)

In both cases, if the penalties were different, the motives were surely the same—to prevent valuable foods from being kept from the master's table or the market. Thus, many dietary customs described 50 or 100 years ago by ethnologists and travellers among peoples which had hitherto had no contact with western civilization have today vanished.

The progress of diversified agriculture, the introduction of new vegetable or animal species, the increased production of fisheries, the improvement of preservation methods

* *Deaths in the course of the first year per* 1,000 *live births.*

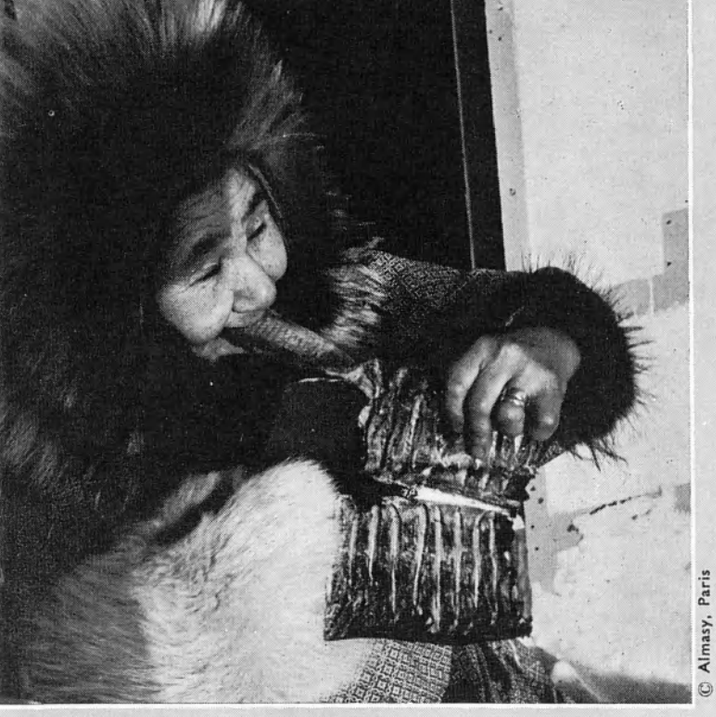


Photo Jack Ling - Unicef

© Almasy, Paris

ONLY ONE DISH ON THE MENU

Food habits, were initially imposed by the environment and the limitations of production. Thus, an Eskimo's diet (left) is almost solely composed of meat—caribou, seal, fish—while that of India's people (right) is almost wholly vegetable in origin. Three-quarters of mankind in essence know only one dish, a basic food flavoured by a sauce of some kind.

and distribution systems, the pressure of commercial propaganda and the emergence of a purchasing power help to change the dietary type by modifying the economic sub-stratum which determines it. But, above all, it is *education* which, by changing the cultural sub-stratum that shaped dietary habits, is responsible for the great changes which have taken place. This education is carried out:

First of all, by schools where teaching relegates to the subordinate ranks the sorcerers and witch-doctors whose gifts are at last being questioned; where instruction in simple notions of agriculture, diet and hygiene is each day occupying a larger place, linked with school meals, gardening and even the raising of poultry and fishbreeding; where the girls learn housework, cooking, care of the family and child-care; where, in short, is trained not only an élite which will migrate to the towns but also a rural population better prepared than its ancestors to raise community living standards—material and intellectual.

By maternity or child centres where an increasingly well-informed staff teaches mothers to feed their young children in a rational way, thereby attacking—and already with success—the difficult problem of harmful practices at the moment of weaning;

By community development movements—adult groups, youth clubs, women's clubs and social centres—where talks are given by lecturers in popular agriculture and rural domestic economy, by social assistants, health educators, public nurses, school-teachers, in a word by all those with access to peoples prepared by the spirit of co-operation and mutual assistance which community development implies to learn from better informed teachers the methods needed to ensure the raising of their condition in general and their food standards in particular.

The rôle of international organizations in co-operation with the national authorities is to train such teachers, from the highest level to the village level.

In the nutritional field, this pre-supposes a knowledge of dietary types and habits and of their economic and socio-cultural sub-stratum, the determination of resistance points and weak points with a view to attacking vulnerable practices or by-passing obstacles which are too deep-rooted, the choice of priority targets in accordance with the urgency of the nutritional problems and with due regard to existing or potential resources. It calls, too, for the orientation of production or the provision of trade channels so that the demand to be created can be met without an untoward effect on prices; in short, a national food policy, an operational plan at the local level, work methods and, finally, the training of the staff needed to carry the programme to a successful conclusion.

Hundreds of such programmes are being conducted by one or another of these methods while, over the last three years, an effort has been made to strike on all fronts simultaneously: schools, maternity and child centres, community development programmes, public education campaigns. Some 50 programmes of education in food and diet are under way in more than 40 countries.

These programmes are conducted under the auspices of FAO, UNICEF, WHO and sometimes UNESCO. The importance of the programmes has not so far exceeded the pilot stage: thus the programme under way in Costa Rica affects 60,000 out of a total population of 700,000. The four programmes in India concern between 2 and 3 per cent of the population. But already governments are convinced of the success of these programmes and are anxious to increase them very rapidly.

Thus, India not only wishes to extend these programmes to 16 States within three years but also intends to increase the area of application within each State. Brazil, whose poverty has been so well described by Josué de Castro, wishes to set up such programmes in all the north-east States where two programmes are now being carried out. From throughout the world, requests for financial and technical aid reach FAO.

The programmes are limited by the lack of credits to carry out basic surveys, to salve certain problems of applied research, to train directing staff or cadres, to supply certain equipment or merely transport means which increase the effectiveness of "know-how," and finally to pay those who set the programmes going and run them until such time as the national staff is competent enough to be left to itself.

The aim of the "Campaign Against Hunger" is precisely to come to the assistance of those countries where hunger reigns, not only by giving them food surpluses, sent urgently as a partial and temporary solution, but by putting at the disposal of those countries specialists for the training of men with whom, through additional material aid, they will set up programmes designed to bring about important and lasting results in the field of the production and utilization of foodstuffs.

International aid would make it possible to reach within twenty-five years objectives which, at the present rate, could only be attained in a century. But time presses and terribly so, for, as José Americo has said:

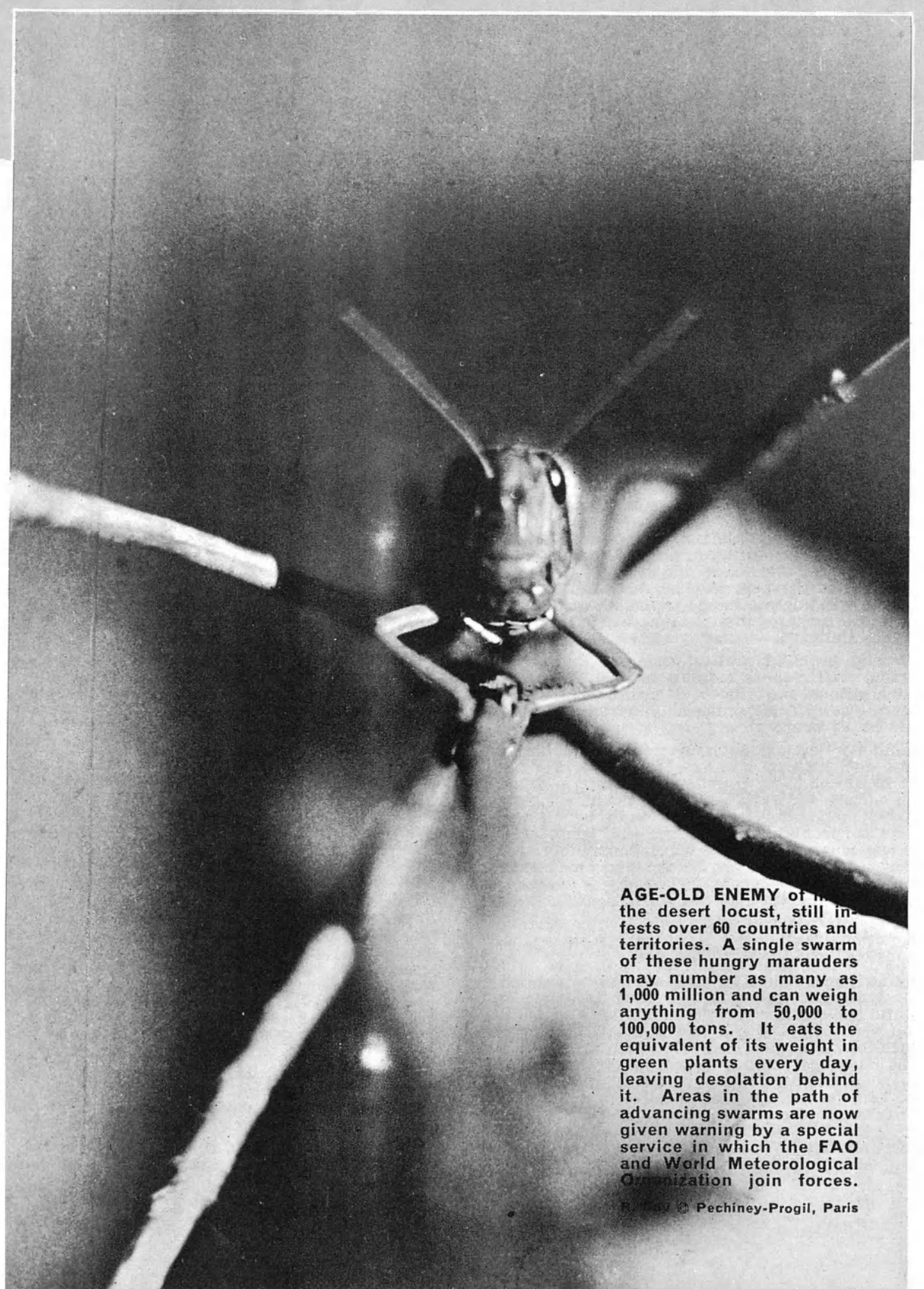
"Worse than dying of hunger in the desert
Is to have nothing to eat in the Land of Canaan."

THE FOOD DESTROYERS

INSECTS AND OTHER PESTS RAVAGE CROPS THAT COULD FEED UNTOLD MILLIONS OF PEOPLE

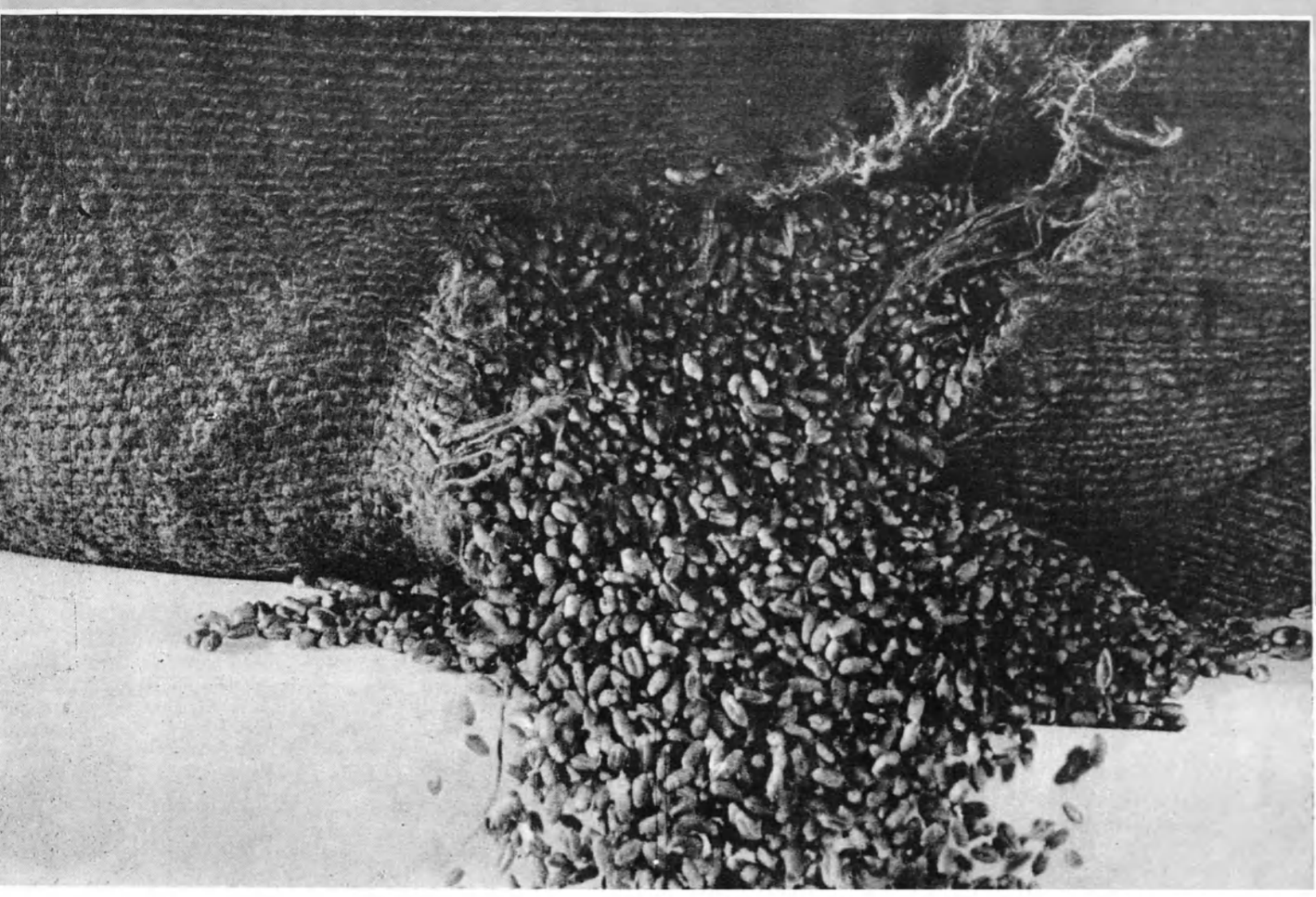
by Dr. J. Vallega

Director, Plant Production
and Protection Division, FAO



AGE-OLD ENEMY of [illegible] the desert locust, still infests over 60 countries and territories. A single swarm of these hungry marauders may number as many as 1,000 million and can weigh anything from 50,000 to 100,000 tons. It eats the equivalent of its weight in green plants every day, leaving desolation behind it. Areas in the path of advancing swarms are now given warning by a special service in which the FAO and World Meteorological Organization join forces.

[illegible] © Pechiney-Progil, Paris



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STOREROOM RAIDERS like insects and rodents each year cause losses equivalent to the produce of scores of millions of acres. Modern methods of grain storage could greatly reduce damage by such pests as weevils and rats.

JULIAN HUXLEY in his essay on "Living in a Revolution" said, "human evolution has been getting faster and faster—its tempo during recorded history is at least 100,000 times faster than that of pre-evolution."

Fascinating changes which characterized the last decade of the nineteenth and the first decade of the twentieth century support Huxley's view. Human knowledge, from physics to sociology, vastly expanded during this time and an impressive number of discoveries brought men to the dawn of a new age of wealth and achievement. Then, in less than 25 years, two world wars threatened to destroy this modern civilization and lay waste the efforts of thousands of brilliant scientists and technicians who had paved the way to a better life. But, despite the havoc wrought, the wars acted as "a hot house" in forcing the pace of scientific and technological progress. Even the terrifying development of the atomic bomb has made possible man's peaceful uses of atomic energy.

While this progress in the technically advanced countries is apparent for all to see, in some emerging countries it has slowed down, in others it has come to a standstill and in some the situation has grown worse than it was before the Second World War.

Today, although more food is produced than at any previous time in history, we are still a long way from being able to provide enough food for everybody. Indeed, the world food situation is perhaps more serious than ever. Pests and parasites continue to take a very heavy toll of the food produced, although scientific means exist to keep them under control.

More than one-fifth of the food that should be harvested from the crops planted by mankind never reaches the dinner-table. For example, it has been estimated that about 20 per cent of the annual world food crop plantings is destroyed, or seriously damaged, by insects, disease and other pests, and that in some countries as much as 10 per cent of grain production—food on which money and labour have been spent in cultivation, processing and transportation—is destroyed in store by insects, rodents and fungi.

Other factors which take their one per cent toll here and their two per cent toll there, make up an annual loss of food, which, if saved, would feed several tens of millions of people. The world production of cereal grains in 1959, excluding the U.S.S.R., was 856,000,000 metric tons, of which at least 10 per cent was destroyed in store, a loss of 85,600,000 tons which, at an average ration of about 800 grammes daily per person, would have fed almost 300,000,000 people for a year.

From biblical times, locusts have provided the most striking example of an insect plague:

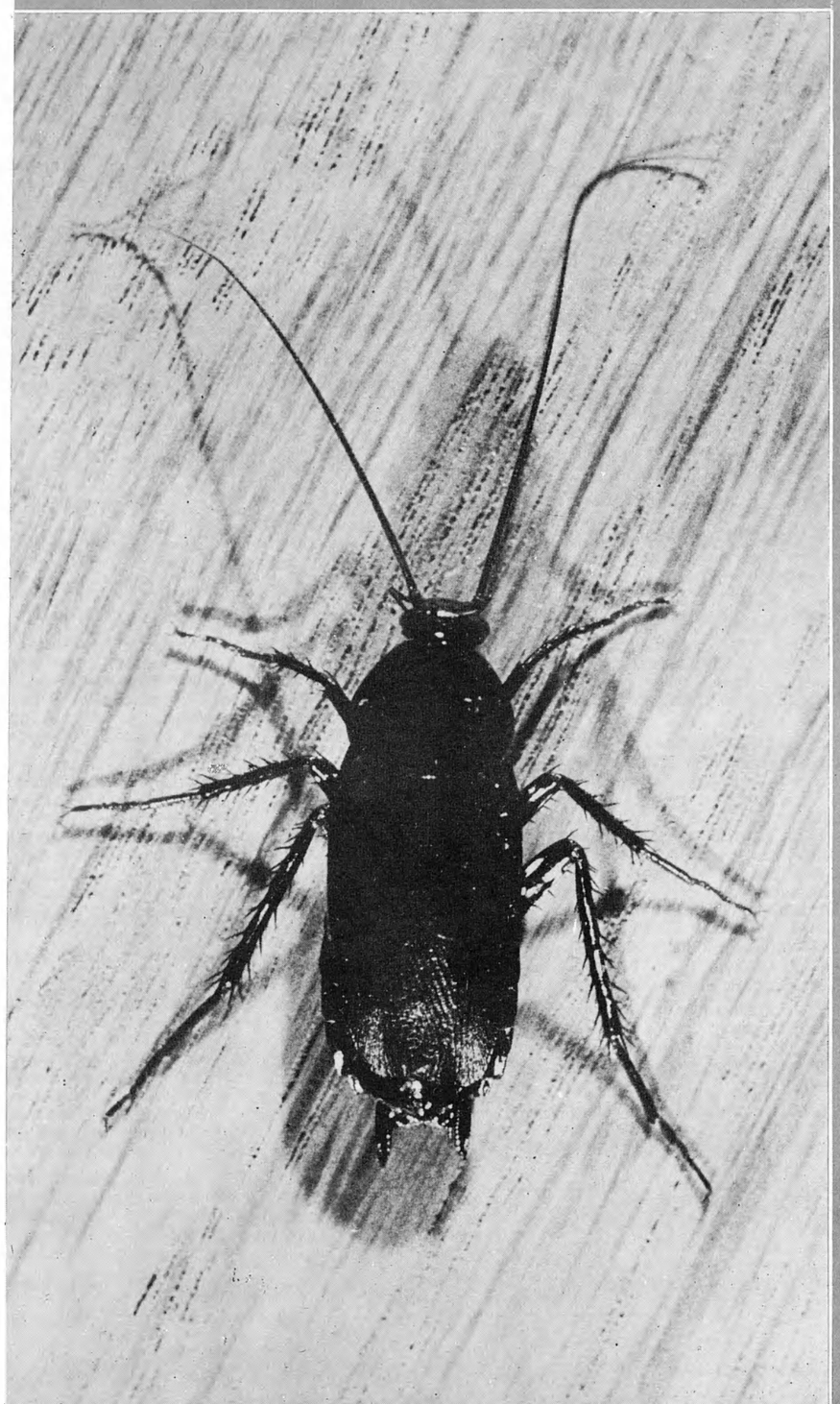
"A nation is come upon my land, strong and without number, whose teeth are of a lion. Like the noise of chariots on the tops of mountains shall they leap, like the noise of flames, of fire that devoureth the stubble. The appearance of them is as the appearance of horses and as horses so shall they run. The land is a garden of Eden before them and behind them a desolated wilderness. Joy is withered away from the sons of man."

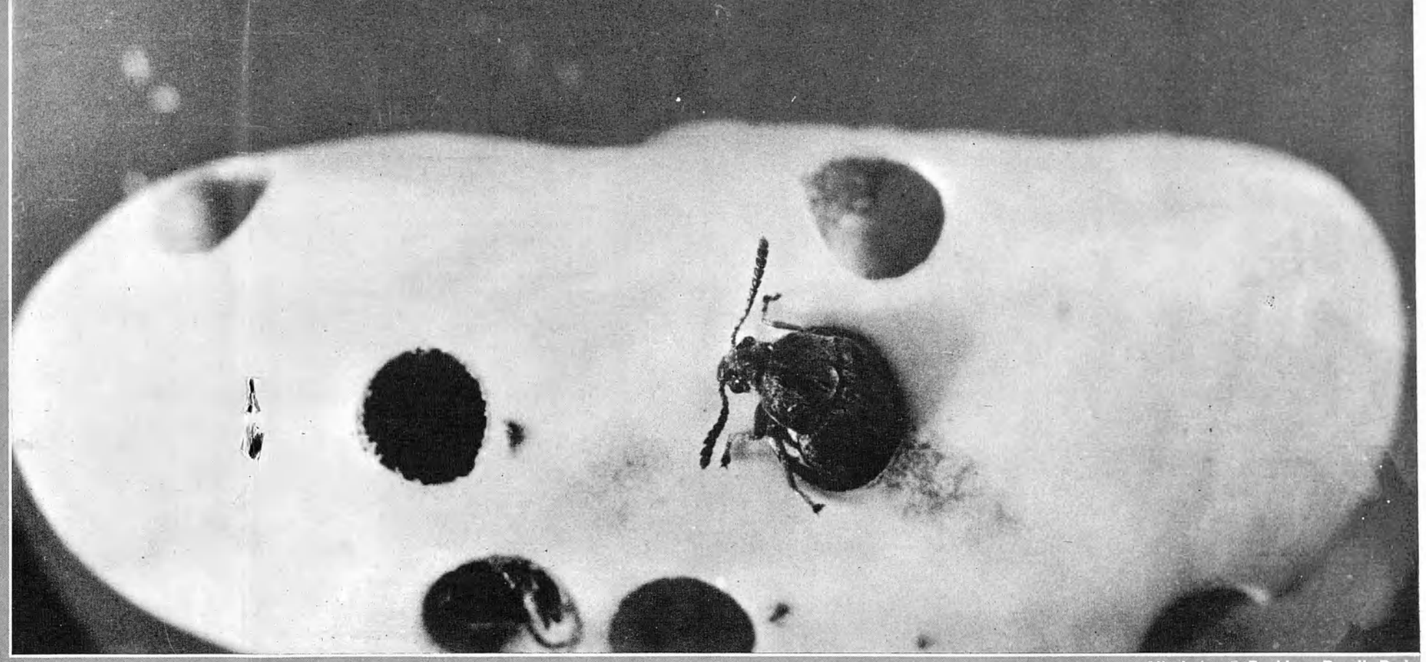
So spoke the prophet Joel of the locusts three thousand years ago, and they still plague humanity, bringing with them the threat of famine to many lands. Throughout the centuries, they have been the scourge of farmers in the Near and Middle East and the northern half of Africa,

CONT'D ON PAGE 36

INSECTS WHO CAME TO DINNER

COCKROACH is a serious pest with house-invading habits. Found in all parts of the world, it feeds on all sorts of things in a house, contaminates food and has an unpleasant odour.



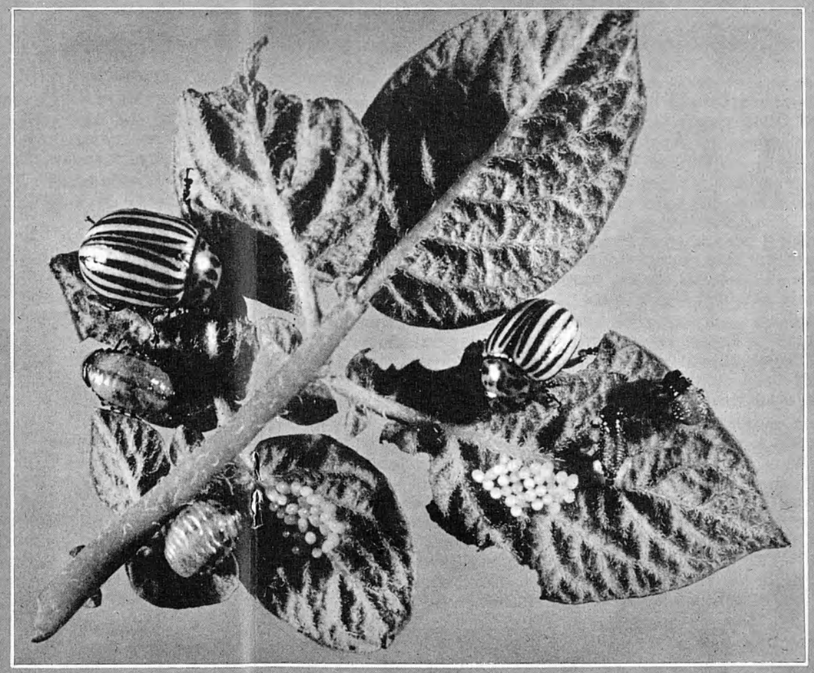


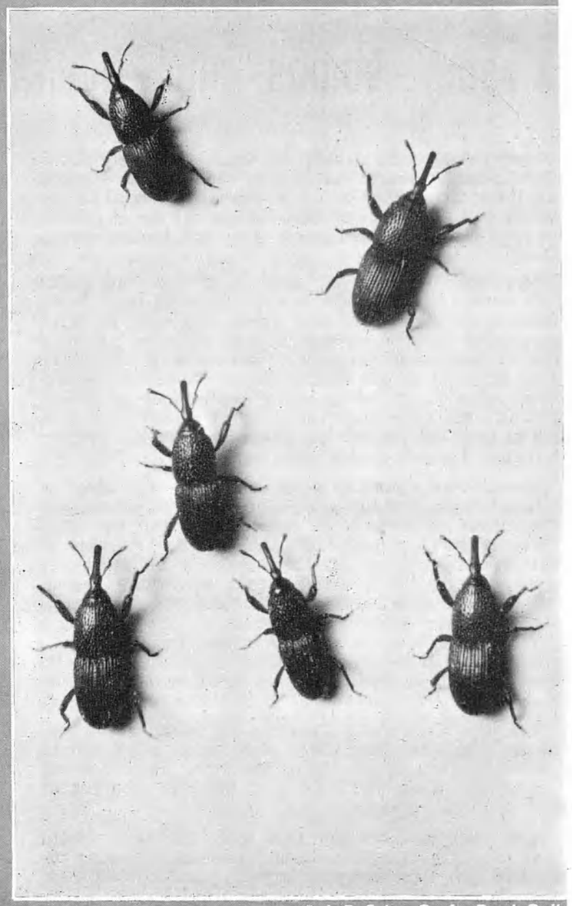
BEAN WEEVIL causes widespread damage to stored seeds that are not protected. It lays eggs on bean pods and the larvae bore into the seeds, later emerging (see photo) as adults. The housewife is likely to come across them when she empties a sack of dried beans and finds them full of holes.

All photos © Pechiney-Progil, Paris

CORN WEEVIL a small insect which attacks stored grain. Both the adults and larvae feed on the grain, and the larvae develop inside it.

COLORADO POTATO BEETLE nibbling holes in potato leaves on which are also eggs and larvae, is the best-known—and from man's viewpoint the most destructive—of leaf beetles. It has spread from its original home in and around Colorado to almost all of the United States and also to Europe.





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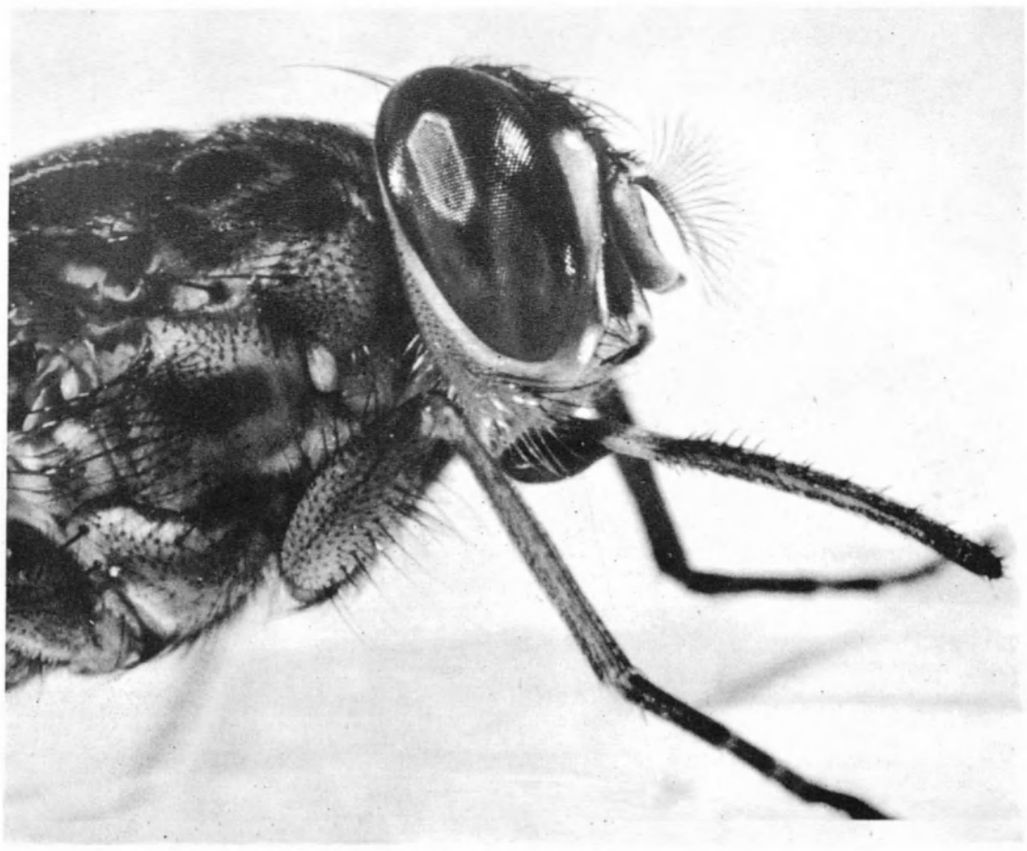


SCOURGE OF TROPICAL AFRICA. More than 750,000 different species have been counted among the world's insects. Some are man's friends and others are his foes, among the most deadly of which is the tse-tse fly (left) which infests over four million square miles of tropical Africa. The tse-tse's bite infects man with deadly sleeping sickness and transmits other organisms fatal to cattle and domestic animals. As a result vast areas suitable for farming are uninhabitable either by man or his livestock. Victory over the tse-tse would restore these lands to man's use.

© J. R. Geigy S.A., Basel, Switzerland

MAN-MADE INSECT. A helicopter fitted with agricultural spraying gear flies over a forest in the United States projecting a cloud of pesticides over the trees. Helicopters and other aircraft have proved their worth in the war against insect pests that ravage man's food crops. They have actually carried the battle against locusts into the air, spraying the swarms in flight.

USIS

Sirens, bombs and flamethrowers of no avail

a persistent plague which has hampered agricultural development. Swarms of locusts, each swarm weighing anything from 50,000 to 100,000 tons, are carried by the winds over thousands of miles. They eat the equivalent of their weight of green plants every day, leaving desolation behind them.

More than 20 countries, members of the FAO Desert Locust Control Committee, are co-ordinating their efforts against the plague. A field force composed of locust specialists, air-spraying experts, meteorologists, biologists, etc., is working in teams over vast areas of Africa, the Near East and the Far East, to destroy the locusts in their breeding areas on the ground or the swarms in the air. But still the locusts are eating our food, although it is hoped that the present campaign will go far towards bringing this pest finally under control.

Monoculture, a practice which consists in cultivating the same crop over vast areas, has also considerably increased the spread of destruction caused by insect pests and parasites because it disturbs the biological balance of nature. Examples of this practice are to be found over large areas of the Americas, Africa and Europe, where thousands of square miles are now cultivated uninterruptedly with the same crops: wheat in the U.S.A. and Canada, sugar cane in the U.S.A. and Cuba, rice in a number of Far Eastern countries, rubber, cocoa, palm trees, groundnuts in many parts of Africa and the Far East.

The natural enemies of the pests and parasites that prey on the crops have disappeared, allowing an extraordinary proliferation of the enemies of the crops. Pesticides and insecticides when available and properly used permit control of most invasions of crop predators.

It appears now, however, that many of the predators have developed a resistance, and even an immunity, to the chemicals which only a few years ago destroyed them in masses. New methods of control and new chemical compounds have to be continuously developed to keep on top in the struggle against man's enemies.

But insects are not the only enemies man has to cope with. A pretty little bird with a red beak, black collar and beige body feathers, which is often kept as a pet, is, next to the locust, perhaps the most damaging winged pest to be found in Africa. Weaver birds in swarms of millions devour crops over hundreds of thousands of square miles from Senegal to Somalia and Transvaal, sometimes driving villagers from their homes by completely destroying their crops.

Here, again, man has struggled to control this pest but, so far, without conspicuous success. The African farmer tries to protect his crops by frightening the birds, beating drums, boxes, tins and anything to make a loud noise. Sirens, detonators, smoke producers and low-flying aircraft have been tried in recent years, but with equal lack of success. Air bombing, flame-throwers to burn the nests and biological control have also been tried but have failed to establish full control of the pest.

Unknown plant diseases continuously appear. About 1928, a new disease appeared in a coconut plantation on San Miguel Island in the Philippines. At that time nobody suspected that this disease would, in about 25 years, destroy all coconut trees on the island—250,000.

Then in 1951 it spread to Luzon where 1,788,000 trees were affected. Destruction soon became widespread, with 4½ million being infected in 1952, 5½ million in 1953, 6 million in 1954, 8 million in 1956, and 9½ million in 1958. The total loss in coconuts for 1958 was estimated at 16½ million dollars. If the disease continues to spread at the same rate, 17 million trees in Luzon will have succumbed by 1964. The probable cause of "Cadang-Cadang," the local name for the disease which means "death," is a virus but this has not yet been identified.

It took several centuries to establish control over epidemics of human diseases, such as smallpox, plague, yellow-fever, etc. This was achieved mainly through

mass-vaccination, constant medical checking, enforced quarantine regulations and permanent medical vigilance. Man has not yet established similar control over animal diseases, nor is he fully aware of the need to do so.

Economic losses resulting from animal diseases are tremendous. For example, in Burma, nearly a million cattle were lost from rinderpest during the Second World War. Most of these were plough and draught animals, and so the farmers were deprived of the power they needed to cultivate their land, as well as milk for their children and dung fuel for heating and cooking. As a result, Burma lost the whole of her annual export surplus of 3,000,000 tons of rice. This not only ruined her economy but threatened famine to neighbouring Bengal.

The 1951-1953 outbreak of foot-and-mouth disease in Europe cost $420,000,000. Mastitis, another serious cattle disease, costs the British dairy industry some $28,000,000 a year, and the U.S.A. about $200,000,000 a year, although the incidence of the disease is only 10 per cent today compared with 30 per cent 25 years ago. In a report published by O.E.E.C. in 1952, it was estimated that the total of animal losses to Western Europe for that year amounted in value to about $16,800,000,000, or 15 per cent of the total output of livestock products—and this in one of the most advanced agricultural regions of the world.

Norris E. Dodd, a former Director-General of FAO, once said that, "if the blood-sucking intestinal parasites of domestic animals could be removed the resulting increase in food would more than satisfy the needs of all the deficient areas of the world."

Technical means exist but the lack of knowledge and purchasing power, particularly in the less-developed countries, have made it impossible up to now to control the enemies. Besides, new dangers have appeared. Air travel, for instance, has considerably complicated man's struggle against animal disease. Long sea journeys, often occupying several weeks, allowed time for symptoms of infectious diseases to develop. But with air travel the time taken seldom permits the development of recognizable symptoms.

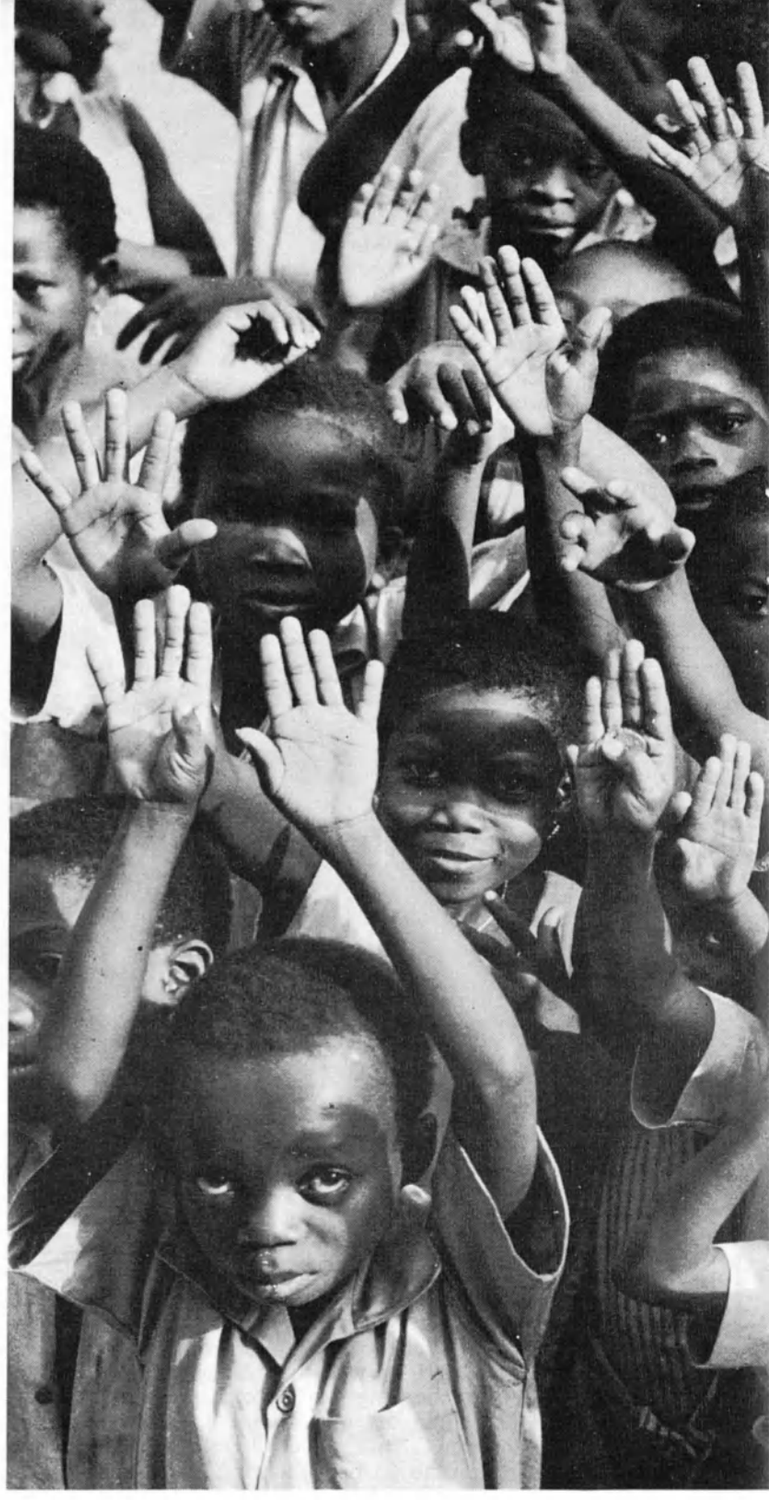
Staff, funds and equipment for research work in plant and animal disease control are insufficient in relation to the magnitude of the problem. Much has been done in the past, more is being done today, but very much more still remains to be done. For this present world is still a rival world where man is struggling against innumerable enemies. There is no turning aside from this fact, no escape and no shortcut. More food must be produced and less food eaten or destroyed by insects, pests and parasites. Only through satisfying the basic needs of man—and food is certainly the first of these requirements —can we hope to build a peaceful world for the coming generation.

CORROSIVE HUNGER

If mankind fails to put into effect, urgently and on a world scale, measures capable of halting the corrosive inroads of hunger, then all that human genius has created will crumble and be swept away like dust, long before a natural erosion could destroy the untold riches hidden in the ground. And mankind, already haunted by the distant threat of a world transformed into desert by the using up of its natural resources, will witness the paradoxal arrival of a world become barren and depopulated even though it still overflows with hidden fertility and riches.

Josué de Castro
in "Geopolitique de la Faim", Editions ouvrières, Paris, 1956

As part of the Freedom from Hunger Campaign, the Food and Agriculture Organization and other U.N. bodies have been preparing a series of 16 "Basic Studies" to help citizens in discussing the great issues involved (see bibliography, page 64). In a general foreword to the series, the FAO chief, Dr. B.R. Sen, notes: "These volumes... cover broad subjects such as the adequacy of food levels in the world, the possibilities of producing more food and the ways in which economic development and training in the newly-developing countries can raise buying power and thus help hungry people to buy more food for themselves." "These studies," writes Dr. Sen, "attempt to summarize the known facts... and thus provide useful and reliable background material for study groups and public discussions." The Basic Studies aim not only at stimulating thought and action on the problem of hunger, but also to bring about "an ever-expanding understanding of the related social, economic and technical issues." The agencies co-operating with FAO in producing this series are ILO, WHO, Unesco, WMO, and the U.N. itself. The article below is taken from the U.N. Basic Study, "Population and Food Supply" which is to be published this summer. Prepared for the U.N. by the Population Reference Bureau it seeks to present an objective picture of world population in relation to the food problem.



GREATEST INCREASES in population growth are taking place today in regions where tempo of economic development is slowest and food deficiencies most pronounced. Africa's present population of well over 200 million, for example, is expected to more than double in the next 40 years. Today more than half of Africa's people are under twenty years of age.

FOOD

FROM a relatively rare creature over half a million years ago, man (or proto-man) moved upward from tens or hundreds of thousands to tens and hundreds of millions by the beginning of the Christian era. For the time of Christ's birth, scholars very tentatively set the total world population in the neighbourhood of 200-300 million.

This guess is probably as good as the assumption generally accepted that this number approximately doubled by the middle of the 17th century to 500 million. The thousand million mark was reached about two centuries later—by 1850; and in the succeeding 110 years the 3,000 million mark has been reached.

Today world population is increasing at a rate which would double the number in about 50 years, and certain populations numbered in the millions are growing so fast they would double in 25 years. This sudden increase is explained not only by the rise in the birth rate but by the sharp decline almost everywhere in the adult and especially the child death rate.

Moderate population growth now extends over all Europe (including the U.S.S.R.), northern America, temperate South America, Japan and Australia, containing about a quarter of the human race. Yet even in these areas the low death rate is resulting in a rapid increase. In the U.S.A. for instance the present rate of three children per family is increasing the population by almost 50 per cent per generation.

Asia with now more than 1,600 million people (excluding Asian U.S.S.R.) may have 2,000 million by 1975 and

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AND PEOPLE

3,900 million by 2000, according to a U.N. analysis. A recent report of the U.N. Economic Commission for Asia and the Far East (ECAFE) indicates that if present trends continue, the population of the region will nearly double in the next 30 years and will then almost equal the entire world population today.

The ECAFE report points out that the Western world witnessed a slow, gradual transition from high death rates and birth rates, to low death and birth rates, in step with a similarly slow and gradual improvement in economic and social conditions. "Per capita income, nutrition, housing and sanitation improved, the death rate gradually fell, and after a time lag the birth rate also fell. But in Asia and the Far East... mortality has fallen before any major improvement in social and economic conditions has occurred. (For example Denmark took 50 years to reduce the death rate from 20 to 14 per thousand; in Ceylon it occured in one year 1947-1948 but with no drop in birth rate).

The ECAFE report contends that the rapid population growth may well act as a brake on economic development of most of the countries of Asia. "This is all the more true," it says, "since the emigration outlet, which provided substantial relief to population pressure in Europe during its demographic transition, is not available to Asian countries to any significant extent."

The combined population of Africa (240 million in 1960) and Latin America (206 million in 1960) is less than a

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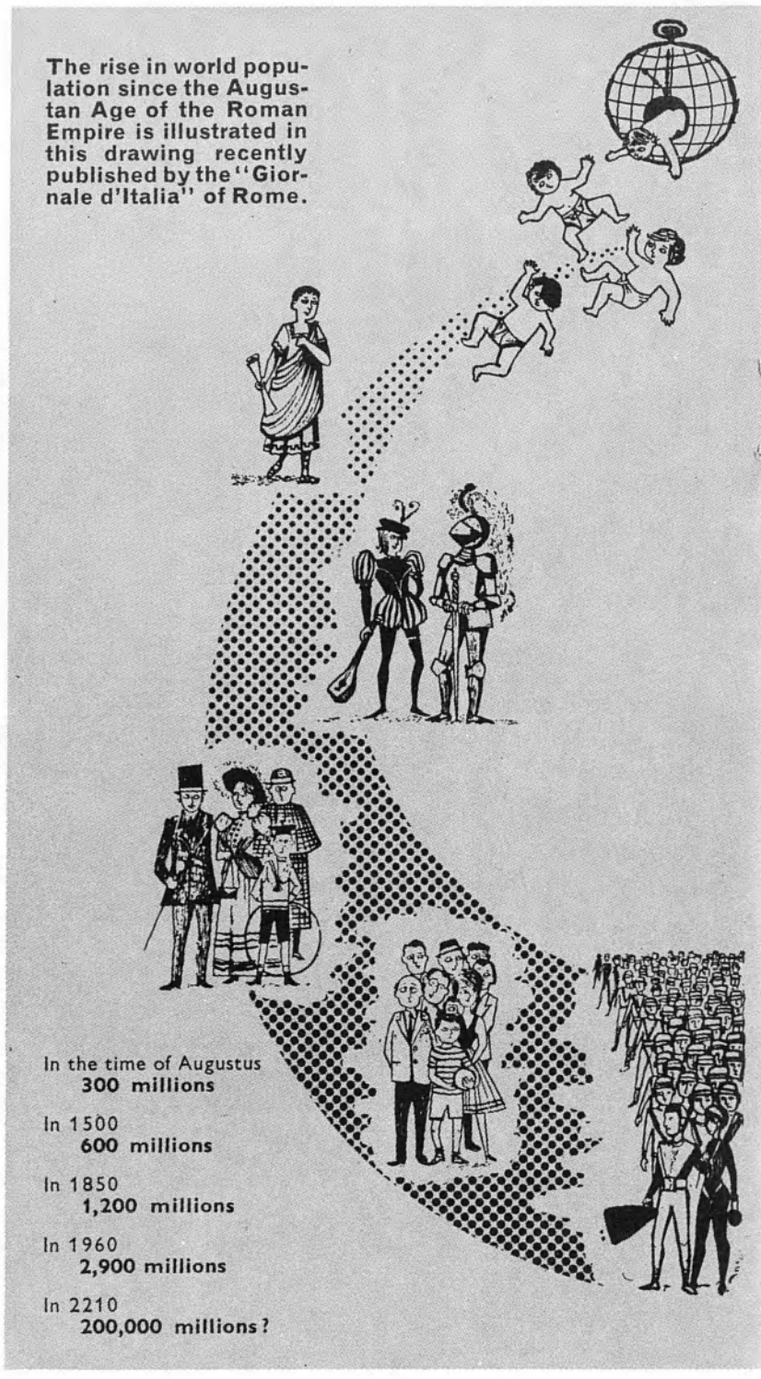
Four general world trends



third that of Asia. Population density is lower and land-resource possibilities are more favourable. The U.N. "Basic Study" on *Population and Food Supply* points out, however, that actual living conditions over large areas of Latin America are marginal, and cites the case of north-eastern Brazil where famine conditions are reported "despite the fact that Brazil's agricultural resources are quite adequate to feed a much larger population than the current 66 millions. With a per capita annual income of less than $250, 42 per cent of the population under 15 years of age and with half the adult population illiterate, the difficulties of utilizing available resources to meet the needs of the people of Brazil effectively are enormous."

From this the U.N. report draws a general conclusion: "The persistence of poverty and hunger in the face of the very real potential for food production and economic development... demonstrates a tragic truth: little advantage is gained from such a potential if the ability and capacity to exploit the natural resources and to build up social and economic capital do not proceed hand-in-hand with population growth."

THE *Population and Food Supply* study then points out that despite many attempts to define and measure "over-population" and "under-population", no generally accepted indicators have been devised. Population density, while it is sometimes a useful indicator of population pressure on agricultural resources, does not take into account the relative abundance or availability through commerce of other natural resources, the extent of industrial development, or the degree of technological progress and other factors which are important in determining the welfare of the population.

"In recent years," the report states, "attention has turned increasingly toward analysis of the relation between rates of population growth and factors influencing economic development, particularly for the under-developed countries where the need for economic progress has taken on such importance."

The U.N. study summarizes the four world trends which influence the social and economic situation: the first is a decline in the percentage of agricultural population, rapid in the developed regions, slower in the less-developed regions. The second is an increase in urban population proportionately slower in the developed countries than in the under-developed ones. Third is the decline in intercontinental migration since the early part of the 20th century, as contrasted with its great importance in the 19th. Fourth is the relatively rapid decline of death rates in the developing regions in recent years compared with the slower previous decline in the industrialized countries, without comparable declines in birth rates.

The effects of rapid population growth, the report continues, compared with slow or moderate growth are several: 1. It tends to increase the pressure of the farm population on land which may already be densely settled, further complicating the effects of excessive fragmentation and land holdings so small as to be ineffecient;

2. It increases the urgent need for capital investment to equip the growing labour force productively;

3. It tends to reduce the amount of capital that can be invested in productive equipment. The capacity to produce does not rise proportionately with the rise in population in countries with a labour-surplus, though the need to consume does, and this puts heavy demands on limited capital to meet social needs that are not immediately productive in economic terms but are nevertheless essential (such as schools and hospitals);

4. It results in a population with a relatively low percentage of people in the effectively productive age groups, so that on the average each person of working age will have to support a large number of dependents.

"In terms of simple arithmetic,* it seems evident that the problem of achieving the needed increases in food production during the next decades would be made easier, and the risk of failures would be diminished, if the population were to increase less than present trends indicate for the economically less developed regions of the world.

Actually, the mathematics of the problem are not so simple; it is not just a question of addition of a larger or smaller number of consumers to share a certain quantity

* From here on this article is composed of verbatim passages from "Population and Food Supply."

FUTURE PROSPECTS

"IN the world picture of food needs and population growth, these four features deserve to be highlighted:

1. Demographic changes take place slowly. There is no prospect that there will be a sudden decline in the world birth rate. Barring catastrophes, there is a good prospect that the world death rate will decline still further. Hence, during the immediate future extending over the next few decades, there is every prospect that population growth will continue at a rapid rate.

2. A vast increase in the production of food to meet the inevitable population increases over the next decades is imperative if appalling disasters are to be averted and the possibility of an orderly and constructive transition to a satisfactory, stable balance between food and population is to be assured.

3. If such a transition is to be achieved, the magnitude of the operation must be recognized. It is all very well to say that "much more food can be produced." To create the technology and the education and the storage and transportation facilities and everything else required to bring this transition to pass is an operation on a scale far vaster than anything contemplated in the plans either of individual governments or of the co-operative undertakings now contemplated by United Nations agencies.

4. Indefinite multiplication of people on a finite planet is impossible. If the rate of population growth which is occuring in some areas of the world today were to be applied to the total human population of the planet, within only two or three centuries the entire land surface of the earth would be covered with human beings."

— from the U.N. Basic Study, "Population and Food Supply"

of food, for people are producers as well as consumers. While population growth adds to requirements, it also contributes through increasing manpower to the possibilities of producing food and other goods.

With few exceptions, the experts who have studied this question agree that the outlook would be far more favourable if the present rates of population increase in the under-developed countries could be slowed down by moderation of birth rates. In fact, some experts hold that unless the growth of population becomes slower in the near future, there is little hope of improving the conditions of life in many of these countries, or even to hold the present low levels of living may prove to be difficult.

In the case of India, for example, it is clear that the present rate of population growth is a very serious impediment to the country's economic development and the solution of its food problem. A.J. Coale and E.M. Hoover have worked out a series of three models to show how the conditions appear in 1986. In each model it is assumed that the death rate will fall by more than 40 per cent by 1986.

Model I assumes that fertility begins to decline immediately and continues down to half its present level by 1981.

Model II assumes no change in fertility until 1966, and then a decline so sharp that fertility is cut in half by 1981.

Model III assumes that fertility will remain at the present level until 1986.

Under Model I, with an immediate decline in the birth rate, the population will grow to 589 million by 1986. Since there is no immediate prospect of an effective lowering of the Indian birth rate, this model is mainly of theoretical interest. But if India's birth rate had miraculously started to decline in 1959, her economy and the welfare of her people would be far more advanced in 1986 than under either of the other alternatives.

Under existing conditions, there is a definite possibility that Model II might be achieved. If the birth rate should begin to drop sharply after 1966, the population would grow to 634 million by 1986.

Under Model III, with the birth rate remaining at its present level, a population of 775 million is the prospect for 1986. That is nearly double the present population.

COALE and Hoover find that continuing high fertility would present a major barrier to an economic break-through. The proportion of children under 15 in 1986 would be so high (42 per cent, compared with 30 per cent for the low projection) as to constitute a decisive handicap to economic development.

By that time, only 10.1 per cent of India's national income would be available for productive investment. With almost twice as many people, each year a larger proportion of capital would be diverted for essential social services, such as health and education and for non-productive investment, such as housing. In contrast, under the low-fertility pattern of Model I, 14.7 per cent of the national income would be available for productive investment.

The difference between 10.1 per cent and 14.7 per cent of the national income may not seem impressive. But for a nation struggling to emerge from a marginal agrarian culture, it might well mean the difference between victory and defeat in the battle for economic self-sufficiency. The higher percentage would be adequate to provide a gradual improvement of living levels.

The problem is not the same where the density of population is lower and there are large reserves of unused or little used land suitable for agriculture, as in many countries of Latin America and Africa. But it has been pointed out that even in such circumstances, excessively rapid growth of population is a major hindrance to economic development. The report of a recent United Nations seminar on population problems in Latin America makes the following observations on this score:

'Of course for each new mouth there is also a pair of hands. But the mouth has to be fed now; the hands become useful only some years later. In several Latin American countries as much as 40 per cent of the population is under the age of fifteen. At the same time, Governments must find productive jobs for a rapidly growing and sometimes poorly trained labour force, a task which entails demands on scarce capital resources which would not be made by a population growing less rapidly. From each of these points of view, present rates of population growth are a real handicap to economic development.'

The issue of population policy and birth regulation is not purely one of economics. It also involves questions of cultural ideals, moral principles, and social and political philosophy which are seen in different lights by the people

CONT'D ON PAGE 43

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BIG CITIES GETTING STILL BIGGER

The concentration of urban populations in swiftly expanding cities is a world-wide phenomenon of modern times. To these growing towns and cities flock the workers who found they could no longer gain a livelihood in agriculture. In Japan, whose 90 million population has doubled since the start of the century, Tokyo alone (left) has over 11,000,000 inhabitants and is now the world's largest city. Buenos Aires (above) was one of the last of the world's great cities to experience a population "boom" through the influx of emigrants. Inclusive of its suburbs it now has six and a half million inhabitants, which is equivalent to almost the total population of Argentina in 1914.

Official Argentine photo

and the governments of different countries. Some groups object in principle to birth regulation in general or to certain forms of it; others hold that the decision to practice it or not should be left strictly to the people without any governmental interference or pressure.

The councils of the United Nations, confronted with the sharp differences in view on this question, have taken the position that it must be left to each national government to decide its own policy.

The United Nations Population Commission declared in the report to the Economic and Social Council on its eleventh session (1961): 'It is the responsibility of each Government to decide its own policies and devise its own programmes of action for dealing with the problems of population and economic and social development. In particular, each Government must decide for itself whether or not any measures should be taken for the purpose of modifying the trends of population as an aid to the solution of these problems, taking into account the work of the Population Commission.

'On the other hand, it is in the interest of the United Nations that decisions on national policies should be taken, and national action programmes should be planned, in the light of knowledge of the relevant facts, and that the programmes should be adequate to assure satisfactory economic and social progress. Among the circumstances which must be considered are the relevant features of national culture and ideals as well as the trend of population, the physical resources and other economic circumstances of each country.

'It is appropriate that the United Nations should encourage and assist the Governments, especially of the less developed countries, in obtaining basic data and carrying out essential studies of the demographic aspects, as well as other aspects, of their economic and social development problems. It is also considered appropriate for the United Nations to give technical assistance, as requested by Governments, for national projects of research, experimentation and action for dealing with problems of population.'

It would appear from the above that the United Nations neither encourages nor discourages adoption by Governments of any particular population policy, but stands ready upon request to give technical assistance to Governments for the purpose of making effective whatever policies they may adopt.

In four of the most populous Asian countries—India, Pakistan, China (mainland) and Japan—the Governments have sponsored various kinds of measures aimed at encouraging limitation of births and moderating the rate of population growth, as an aid to economic and social advancement.

In India, a programme introduced with the first five-year plan in 1951 provided advice and assistance on family planning as part of the services in hospitals and health centres. In the second five-year plan, this programme was intensified. The third five-year plan provides for further expansion in the programme. However, neither this programme nor a similar one in Pakistan appears as yet to have brought about any great reduction in births.

In mainland China, the programme of family planning was launched in 1955. The results of the 1953 population

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Know-how exists to feed a bigger world

census had just been published, and the effect of the rapid population increase on the problem of industrialization and economic development was realized. But there is no reliable information regarding the effects of this programme on the birth rate.

In Japan, the Government, before and during the Second World War, enforced a pro-natalist policy. But public interest in family planning rose sharply soon after the close of the War, probably owing to economic pressure upon the families. The birth rate dropped from 30.1 per 1,000 population in 1945-1949 to only 17.2 per 1,000 in 1957. As the death rate dropped during this period from 17 to 8 per 1,000, the net result was to bring the annual rate of natural increase of the population down from 1.3 per cent to 0.9 per cent.

Japan's birth rate at present is as low as or lower than the rates of most European countries and considerably below the present birth rates in the U.S.S.R., the United States and Canada.

In Japan's case, the movement to limit births was greatly facilitated by the comparatively high degree of industrialization and economic development of the country, and the high level of education of the people, in comparison with other countries in Asia and the Far East.

In a number of other areas, including Ceylon, China (Taiwan), Hong Kong, and Singapore, family planning activities are supported by the Government although the Government itself does not take a lead in promoting such measures. In countries such as the Federation of Malaya and Thailand, family planning activities are supported by private organizations only, with no direct assistance from the Government.

In those parts of the world where there is strong opposition to birth-control programmes on moral, religious, or other grounds, the solution of the population problems is all the more difficult. The report of the United Nations seminar on population problems in Latin America, mentioned earlier contains the following remark on this subject:

'Most Governments in Latin America would be very hesitant to adopt a policy aimed at encouraging family planning. For them, if they feel any need to slow down population growth, the appropriate measures of policy will be less direct—they might be concerned, for instance, with possible means of instilling into the minds of the poorer and less educated classes of the people a keener sense of responsibility and prudence in regard to marriage and the birth of children, which would be consistent with their religious ideals and the highest values of their culture.'

In spite of all the difficulties, it may prove possible within a decade or two to achieve with determined efforts, appreciable reductions of birth rates in the countries where national policies having this aim have been adopted, or where they may be adopted in the near future. But it scarcely seems realistic in view of all the circumstances to expect a radical reduction of births in the under-developed countries generally during the next ten or twenty years.

Meanwhile, the population of most of these countries can be expected to go on growing rapidly—quite possibly even more rapidly than it is growing at present. Thus it is absolutely imperative to find adequate solutions for the problems of increasing food production sufficiently during the decades ahead, especially in those countries where the present standards of food consumption are lowest and where the largest increases of population are in store.

Experts are convinced that technical knowledge exists to meet the world's present food shortages and to take care of the needs that will result from population growth for some time to come. Similarly there is enough technical knowledge of the means of controlling births to bring about a decided moderation of the rate of population growth whenever the Governments—and more important, the people—have the will to do so.

If everything possible were done to bring the existing technical knowledge of food production methods to bear fully throughout the world—including, among other things, large-scale programmes for training key person-

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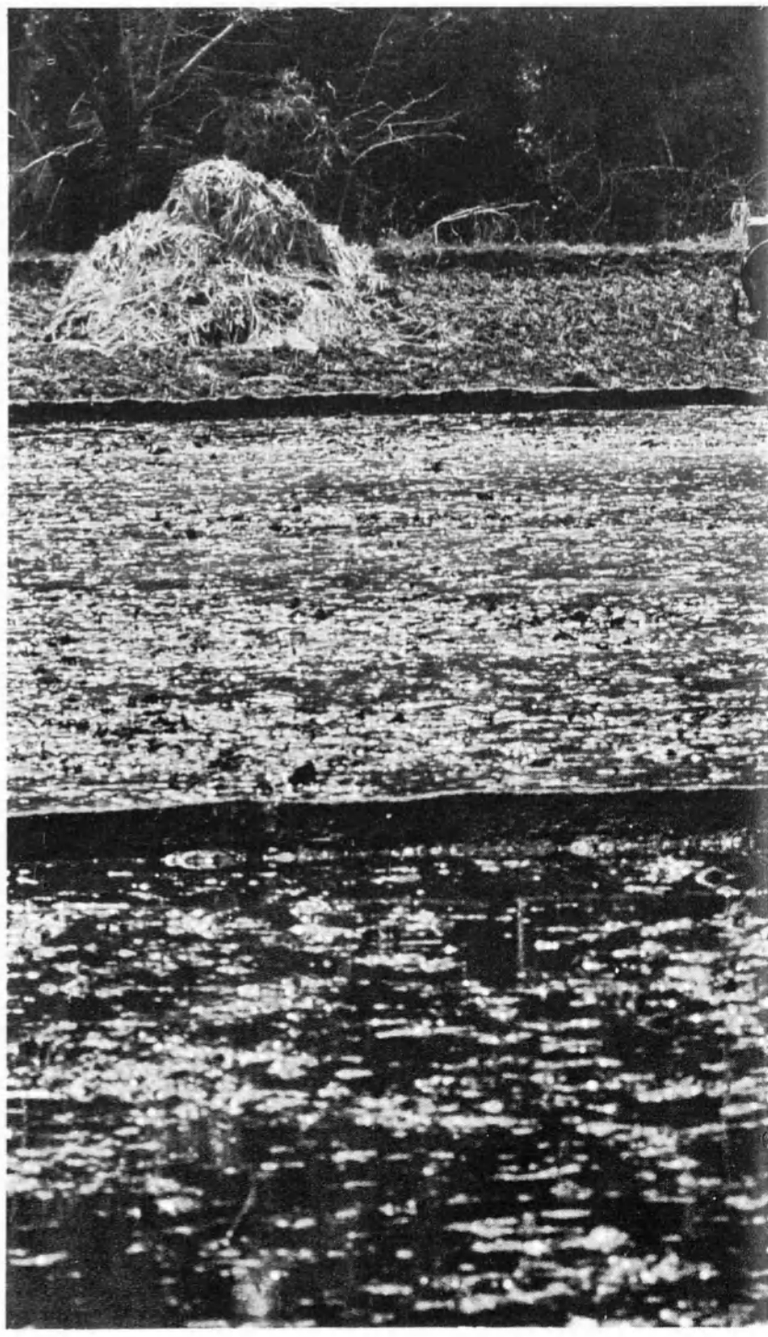


nel, vigorous and imaginative attacks on ignorance and traditional inertia, and massive mobilization of capital on a world-wide scale for investments in agricultural and industrial development of the underdeveloped regions—the Freedom from Hunger Campaign might achieve its great objective over the course of some decades. But neither the present programmes nor the efforts to implement them are adequate.

In India, for instance, the current large expenditure on agricultural research and development has served to increase food production by about 3 per cent a year, but an 8.2 per cent annual increase is necessary to meet the 1965-1966 targets for adequate production.

With reference to the countries of Asia and the Far East, the ECAFE report previously quoted puts the problem in these terms:

'...If Asian agriculture adopted the modernized techniques used in some parts of the world, food production in most of the countries could probably be made to keep pace with this upsurge in demand for food. In addition, research and technological advance may make it possible to cultivate land which has been hitherto considered uncultivable... On the assumption that average land productivity in Asia could be raised to Japanese levels, that calorie supplies were increased to 2,500 per person per day and the present low-protein type of diet maintained, many countries could still support a population two or three times as big as their present population. Assumptions, on the other hand, of calorie supplies at the same level as in, say, the western European countries, and a diet of a high animal protein content would imply that many countries, even at the very high Japanese levels of land productivity, could support fewer people than their present populations...'

PLOUGHING A WET FURROW. Despite its relatively small area of arable land, Japan's agricultural production will soon exceed its needs. This is due to a greater use of chemical fertilizers, the mechanization of fishing fleets, the elimination of illiteracy and improved ways of cultivation (below).

FOREWARNED IS FOREARMED

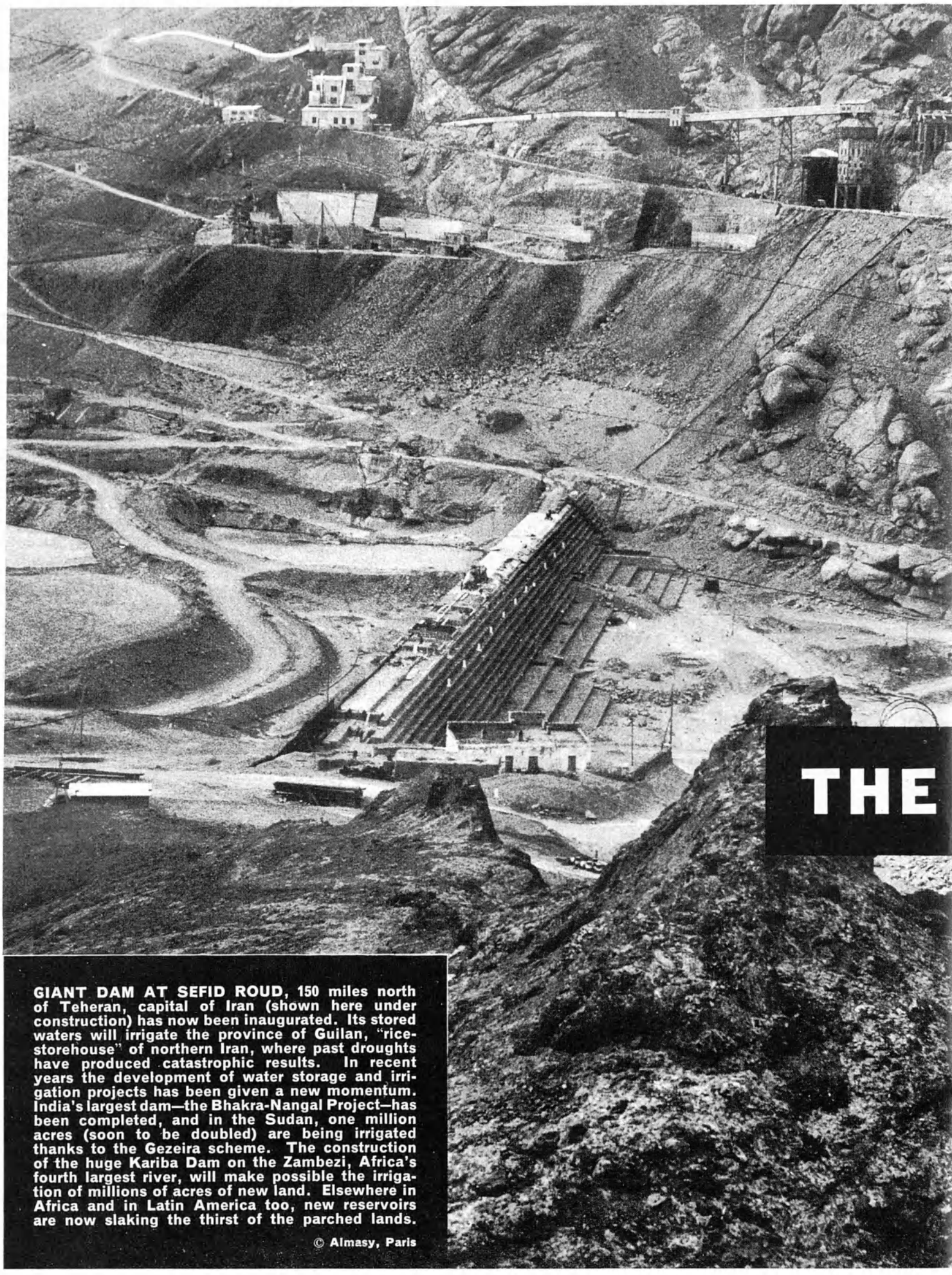
Apart from the direct help which the Freedom from Hunger Campaign could provide, it was important, above all else, in teaching by example the younger generation who, in twenty years, would be sharing the world with 4,000,000,000 people. Everyone, everywhere, must be brought to recognize that this, together with the menace of nuclear destruction, is one of the two most pressing problems of our times, overriding patriotism, national aspirations or ideologies.

RITCHIE CALDER
from "Common Sense About a Starving World"
Gollancz, London, 1962.

In addition to the programmes for increasing agricultural efficiency through fertilizers, seeds, mechanization and better techniques, there is the technical possibility, although at somewhat higher costs, of producing foods from sources not now exploited: algae, yeasts, fish meals, and hydroponics (crop growing without use of soil), and by the use of extractive methods for converting plants directly into proteins and oils instead of raising secondary sources of nutrients such as fish and animals.

By 1970, the population of the earth will be increased by over 500,000,000. Most of this increase can be expected to occur in the underdeveloped, food-short regions of Asia, Africa and Latin America, where population growth rates in some countries are now higher than any that have been known in the history of the human race.

Time is too precious to be wasted in arguments over what steps should be taken first to deal with the problem of population and food supply. Nothing less than an 'all out' attack on all major aspects of the problem can bring success. To banish hunger and achieve a minimal diet for all people in the face of rapid population growth will at best take time. To check population growth in those countries where such is the desire of the people and their governments will also take time. And time is of the essence."



THE

GIANT DAM AT SEFID ROUD, 150 miles north of Teheran, capital of Iran (shown here under construction) has now been inaugurated. Its stored waters will irrigate the province of Guilan, "rice-storehouse" of northern Iran, where past droughts have produced catastrophic results. In recent years the development of water storage and irrigation projects has been given a new momentum. India's largest dam—the Bhakra-Nangal Project—has been completed, and in the Sudan, one million acres (soon to be doubled) are being irrigated thanks to the Gezeira scheme. The construction of the huge Kariba Dam on the Zambezi, Africa's fourth largest river, will make possible the irrigation of millions of acres of new land. Elsewhere in Africa and in Latin America too, new reservoirs are now slaking the thirst of the parched lands.

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A BOOST FOR PRODUCTIVITY

IN time of need, man has found ways to win more food than he believed possible from the soil. Switzerland, for instance, despite its limited arable land area, nearly doubled its agricultural production during the Second World War.

WOULD you like to know, for any region of the world, which kind of corn you can cross with another so as to obtain a hybrid suitable for a given climate or a given degree of humidity, resistant to a certain kind of plant disease or animal pest? At FAO Headquarters in Rome, a young woman presses buttons and the information you need shoots out of a filing cabinet. Like a huge matrimonial agency for members of the grain family, this collection of information has made possible millions of successful marriages.

MAIZE production has been multiplied thanks to hybrid varieties. Where a harvest of 1,350 lbs per acre was considered a great triumph a generation ago, 3,500 lbs is now possible. New fertilizers have also enabled the yield of many other cereals to be tripled or quadrupled.

THE oceans are a vast food hamper of practically inexhaustible resources. The nutrient material produced annually by the sea amounts to one hundred million million tons, of which only a minute proportion, the world over, is recovered as edible fish. . .

THE upward trend of world fish production continued in 1961, rising to a total of about 40 million tons, or some 7 % more than in 1960. A large part of this expanded catch came from Peru which has quickly become third largest fish producer in the world, with 4.5 million tons in 1961 compared with only 500,000 tons in 1957. Production increased rapidly in the U.S.S.R. and also in Japan where it is estimated to have reached six million tons in 1960 for the first time. In several important fisheries of Western Europe, however, catches were smaller.

COFFEE, soybeans, cocoa, sugar, maize and rice showed the largest increases in the world production of major agricultural commodities in 1960-1961, in comparison with average production figures for 1953-1957.

AGRICULTURAL prices continued to drift downwards during 1961 although more slowly than in 1960. By the end of 1961, sugar prices were the lowest in twenty-five years.

WORLD meat production in 1961 (59.8 million tons) was 19% above the average production between 1953-1957.

IN the less-developed regions of the world, the upward trend of food production has been especially marked in Brazil, Egypt, the Federation of Malaya, Iran, Israel, Japan and Mexico.

OCEANIA'S food production rose by 6% in 1960-1961. Australia's wheat production was 13% more than in 1959-1960.

A surprising fact about increased food production in Western Europe is that the majority of countries where per capita increases were most marked between 1952 and 1960 (Greece, Italy, Spain and Yugoslavia) are in the economically less developed southern part of the region.

WORLD rice production increased by 6% in 1960-1961 as the result of abundant harvests in India, Japan and Pakistan and in secondary producing countries.

THE world's per capita food production (excluding Mainland China) which recovered its pre-war level during the period 1948-1949 and 1952-1953, has now risen to about 14 % above the pre-war figure.

PRELIMINARY estimates show that world milk production rose by about 2% in 1961. The largest proportional increase (about 4%) was in Western Europe and Canada. In Australia production declined by about 5% owing to adverse weather.

POLAND had a record grain harvest of about 16 million tons in 1961 and its agricultural output rose to a new peak over 8 % above the previous year.

FIRST VICTORIES

by Dr. Frank W. Parker

Assistant Director-General, Technical Dept., FAO

THE fight against hunger has been going on since the world began and man, until recently, has not been well equipped for the struggle. Even when he turned from hunting to agriculture, which did much to secure a regular supply of food, the struggle was still unrelenting. Droughts and floods, the vagaries of weather and the attacks of diseases and pests often destroyed his crops. Indeed, the history of mankind in agriculture is marked by disastrous famines.

Records are incomplete, but we know that in the first 1,800 years of the Christian era there were 350 famine years in Europe—a famine in one year out of every five. Even in Britain, a fertile island not usually associated with famines, there was a recorded famine in one year out of every ten. In other parts of the world people suffered more severely. For instance, during the 2,000 years for which records are available in China there have been 1,800 famines, almost an average of one every year.

Real progress in the fight against hunger and malnutrition has been recent. Before 1800 most of the world was ill-fed by the standards of today. As late as 1840 the French food supply was largely cereals and starchy roots, with only one-third as much meat as they have now. It had much the same characteristics as that of some of the underdeveloped countries of today. What produced the change in the developed countries of the world during the last 120 years?

Modern agricultural research may be said to have had its beginning in the 1840's with the establishment of the Rothamsted Agricultural Experimental Station in England by Lawes and Gilbert and the chemical research of Liebig in Germany. These pioneer research workers also initiated the production and use of chemical fertilizers and experiments that led to the understanding of the value of legumes and their use in crop rotations. From

CONT'D ON NEXT PAGE

MOTORIZED FISHING BOATS and improved gear have done much to boost harvests from the sea in areas of the world where boats and equipment have changed little since far-off times. Here, traditional fishing craft now fitted with outboard motor shoots past sail-driven vessel off the coast of Ghana, where fish catches have shown great increases, adding valuable protein to food supplies.

U.N.-Unesco

The spectacular example of Japan

this beginning, research expanded in Europe and in North America with the establishment of the Federal Department of Agriculture and the Land Grant Colleges and Experiment Stations in the 1860-90 period. The research programme expanded from production and the utilization of natural resources to include work on marketing, nutrition, and economic, social and organizational problems.

Agricultural development proceeded slowly throughout the nineteenth and beginning of the twentieth century. For example, in the United States the index of agricultural production only increased about 20 per cent in the 25 years from 1914 to 1939. In this period, however, production and economic research, agricultural education and extension laid the basis for rapid progress when increased production was essential.

World War II and the post-war period produced the demand and the other economic incentives favourable to increased production in North America, Western Europe, Japan and Oceania. Throughout these regions programmes were developed to make this demand felt effectively at the farm level, and supplies of credit were provided to enable farmers to secure the material needed to put advanced technical knowledge into practice on a wide scale.

In North America, despite some restrictions, agricultural production is currently 50 per cent greater than in the pre-war period. That is, the rate of increase over the last 20 years has been more than three times the 1914-1939 rate. In Europe, current production is about 25 per cent greater than before the war. These regions, and Oceania, have attained adequate levels of nutrition for nearly the entire population, and they are currently more concerned with the difficulties associated with agricultural abundance than with the means of increasing production.

This new situation may be attributed in large measure to the wide-scale application of the accumulated store of science and technology to agriculture, as well as to changes in the economic and institutional conditions at the farm level which encourage its use. The work that was started in the 1840's is paying great dividends. Let us now see what is occurring in the rest of the world.

Japan, the most highly industrialized country in Asia, steadily increased agricultural production in the period 1880-1940. Current production is more than one-third greater than pre-war. The population growth in recent years has been about one per cent per year. Agriculture has made a substantial contribution to the great improvement in the national economy and diet in the last decade.

As in the West, Japan's increased production is due to the rapid application of science and technology to agriculture. This is reflected in the level of use of insecticides, fertilizers, and increased mechanization by the use of garden tractors and other machinery. This progress was made possible by suitable institutions to serve agriculture and economic incentives, including agrarian reform, to encourage farmers to make the investments required.

The example of Japan and Taiwan, which is also increasing agricultural production at a good rate, is of great significance for the rest of Asia. Their record shows that the application of scientific methods and practices is as effective in Asia as in North America and Europe.

The foregoing examples of positive achievements in the fight against hunger show that in the more developed and industrialized countries of North America, Western Europe, Asia (Japan) and Oceania the battle against hunger has been largely won, the great achievements having been made in the last 35 years. The real question before the world today is whether similar, or even greater, progress can be made in the underdeveloped countries of the world. We shall now examine some evidence that gives at least a tentative answer to that question.

A number of the less developed countries, including Mexico, Greece, Yugoslavia and Israel, have rapidly increased agricultural production in the 1950's. Production in this group of countries has increased at the rate of 5 to 8 per cent per year, whereas, with the exception of Mexico and Israel, the rate of increase in population has

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H.P. VERSUS OX POWER. Studies and experiments to evolve cultivation methods appropriate to local and regional conditions and material resources have already paid big dividends in richer harvests. Above, comparative experiment in tractor and ox-drawn ploughing takes place in same Mexican field to ensure identical soil and weather conditions for a fair comparison of results.

been less than 1.5 per cent. In Greece, the production of cereals increased from an average of 1.5 million tons per year in 1949-52 to 2.5 million tons in 1959-60. In Mexico, the increase was from 4.0 to 7.4 million tons in the same period.

How was this accomplished? Both countries increased the area under irrigation, and developed and now use improved high yielding, disease-resistant varieties of major cereal crops. The use of chemical fertilizers increased from 48.0 to 129.2 thousand tons of plant nutrient in Greece, and from 21.5 to 172.5 thousand tons in Mexico. In other words, these countries applied essentially the same practices and technology that had increased agricultural production effectively in North America, Western Europe, Oceania and Japan. Associated with the improved technology were good agricultural research, extension, the provision of credit and cost-price relationships that gave an incentive for production.

The countries were substantially assisted by foreign aid programmes. Greece, for example, is estimated to have

CONT'D ON PAGE 52

THE 'ALCHEMY' OF FOOD

IN a farm in Malaya, pig raising and fish breeding complement each other. Pig manure is put into the fish pond as fertilizer for a water plant on which the fish feed. The fish in turn are used as pig food. Another plant called ipomoea grows in the pond and provides the pigs with fresh fodder. According to an FAO specialist, "a pond suitably prepared to receive the wastes from a pigsty can produce, at no cost whatever, 250 lbs of ipomoea and 7 lbs of fish per acre daily."

FISH breeding has still plenty of resources in reserve. The African tilapia, which has been called a "miracle" fish, is now being bred on an industrial scale in different areas of Asia and in the West Indies.

THE first factory for the commercial production of fish flour was built in Sweden in 1959. With a high (80%) protein content, this flour is a foodstuff five times as rich as the fish it is made from. Added to traditional foods, fish flour is likely to become an important arm in the struggle against protein deficiency.

CHLORELLA, a tiny fresh water algae, is capable of transforming practically all the energy it absorbs from sunlight into vegetation. In 12 hours it increases its weight fourfold. Its annual yield per acre is over 100 tons—ten times that of wheat. An area five miles square can produce enough protein for 80 million people. Chlorella has six times as much protein as rice, 30 times as much vitamin A as calf's liver and four times as much vitamin C as spinach, which it resembles in taste.

IN the Far East noodles are now being made of zooplankton. In Thailand, for example, more than 5,000 tons of this highly nourishing foodstuff which abounds in the sea, are eaten yearly. Living on a diet composed almost entirely of plankton, the whale becomes huge enough to provide 15 tons of oil, as much fat as 500 pigs and as much meat as 72 head of cattle.

Dr. Melvin Calvin has been awarded the Nobel Prize for having, with the help of radioactive tracers, worked out the complete cycle by which the growing plant takes the energy from the sun, the elements from the air and the minerals from the soil and converts them into the sugars and starches of our basic foodstuffs. Work is going on, notably in the U.S.S.R., on the further stages by which plants produce proteins. Perhaps man may one day be able to start with the elements themselves and, by-passing the intermediates of the soil, the plants and the animals which eat them in order to feed us, make food as a druggist compounds a prescription.

FARMING GOES NORTH. Big changes are now taking place in the world's bleak Arctic tundra, until recently the domain of animals, with only sparse and scattered populations such as the Lapps of Northern Europe and the reindeer-herding peoples of Siberia. Today farming is going north and the Soviet, Canadian and American peoples are growing wheat in their northern territories. Alaska's lands under cultivation now cover over 100,000 square miles, or about half the area of France. On the Taymyr Peninsula, within the Arctic Circle, Soviet farmers are growing maize and potatoes.

Official Soviet photo

Modern technology opens the way

received the services of 10 agricultural experts per year from 1955-61, and about 25 fellows were sent abroad each year for study of approved agricultural methods. Mexico has probably had the assistance of 30-40 foreign experts and has sent about 50 men abroad for training in each year of the same six-year period. Yugoslavia has had a rather exceptional technical assistance programme in that great emphasis was placed on sending men for observation and training abroad—at least 1,400 in the six years. It also received the services of about 25 international experts per year.

This assistance made it possible for these countries to accelerate agricultural production more rapidly than if they had had to depend strictly on their own resources. The transfer of knowledge, together with the economic assistance provided by foreign aid programmes, was undoubtedly a major factor in their success, even though they themselves had to do virtually all the work.

ANOTHER group of 10 to 15 countries, of which Brazil, the United Arab Republic, the Philippines and India may be considered examples, made good progress in agricultural production during the post-war period, even though the progress was not as striking as in the countries just discussed. Most of the countries in this large group increased production at a rate of 2.5 to 4.0 per cent per year, while the population was increasing at the rate of 1.5 to 2.5 per cent.

This, plus some degree of economic expansion provided for a modest increase in per capita food supplies and living standards. We should keep in mind that all of these countries are predominantly agricultural; crop yields are low and illiteracy is high. In other words, they are in a relatively early stage of economic development.

We may now examine the progress of India in more detail, since complete data are available in the recent publication "The Third Five-Year Plan." During the period of the first two Five Year Plans (in 1950-51 and 1960-61) India increased agricultural production by 41 per cent and food grains production by 46 per cent. This approximates to an increase of 3.5 per cent per year. During the same period the population increased 21.5 per cent; consequently, with agricultural production increasing substantially faster than the population, there was some improvement in food supplies per capita and levels of nutrition. Of course, receipt of agricultural surpluses from other countries has helped as well. It is estimated that per capita food consumption increased from 1,800 to 2,100 calories per day, and that per capita consumption of cloth increased from 9.2 to 15.5 yards per annum, or 68 per cent.

These gains in agricultural production were accompanied by an increase in the area irrigated of 36 per cent, 318 per cent in the use of nitrogen fertilizers, 773 per cent in the amount of credit provided by co-operatives, and similar increases in other items that contribute to improved agricultural production.

Of equal, or greater, importance for long-term development is the foundation that has been laid through education, training and the development of institutions which support and serve agriculture. The community development programme, starting in 1952, now reaches 370,000 of India's 500,000 villages. Some 35,000 village-level workers were trained and placed in service during the ten-year period. Local government has been given greater powers and increased responsibility for development.

A National Farmers' Organisation, with an affiliated Young Farmers' Association, has grown and functioned with increasing effectiveness since 1955. Many new agricultural colleges were started. The number of entering students increased from about 1,200 in 1950-51 to 4,600 in 1960-61. This obviously provides for a substantial increase in trained personnel to serve agriculture.

India's agricultural development has been accompanied and supported by development in other fields. For example, the index of industrial production increased 94 per cent in the ten-year period. The installed power capacity increased 148 per cent; general education, as indicated by student enrolment, increased 85 per cent, and technical education 239 per cent.

India is believed to represent a substantial number of countries that have made reasonably good, but not outstanding, progress in agricultural production and development during the last ten years. Probably of greater importance than their actual physical achievement in production is the groundwork that has been laid for even more rapid production increases in the 1960's. The hope of this is indicated in India's Third Five-Year Plan targets which call for a 30 per cent increase in agricultural production, or at a rate of about 5 per cent per year.

India's agricultural development was assisted by the work of about 150 foreign experts per year through various international programmes, and by a much larger number of Indians receiving training abroad under the same programme. These technical assistance programmes made significant contributions in dairy development and animal health; agricultural education, research and training; fertilizer requirements and use; soil conservation and forestry; fisheries; and crop improvement, including the development of hybrid maize.

The results of ten years of technical assistance in India give strong support to the thesis that it is one effective means of accelerating agricultural development. It has made an important contribution to the development of institutions and trained manpower that undoubtedly will provide great assistance to future development.

There are many countries in Asia, Africa and Latin America where the increase in agricultural production in the post-war period has been unsatisfactory, especially when considered in relation to the growth of population. There are many technical, social, economic and political reasons for this. However, it is not lack of technical knowledge of what needs to be done.

AMONG the great positive achievements of the last 10-15 years is the improved understanding of the ways and means of accelerating agricultural production and development under a wide range of conditions. Increasingly effective use of this knowledge will doubtless be made in the decades ahead.

A second positive achievement is the realisation in all countries that technical and economic assistance can make a great contribution to accelerate agricultural and economic development in the new nations of the world. As a result it seems probable that the level of technical and economic assistance in the next ten years will double or treble that of the last ten.

In 1970 and 1980 we should look back on a period of greater growth in improvement of living standards and levels of nutrition than in the past 10 to 15 years. At the same time, through continued research new facts and methods will be developed that will provide the basis for continued progress in the fight for improved nutrition and living standards for the increased population of the world.

E. Khaldéia, A.P.N., Moscow

THE BOUNTIFUL STEPPE. In the Soviet Union, the dread Golodnaïa, or Hunger Steppe, has been given a new name: "The Bountiful Steppe." Between 1949 and 1956, 175 million acres of virgin land were brought under cultivation and produced rich grain harvests (above). There are still vast amounts of empty space in the world. In Ethiopia alone, more than 180 million of the world's most fertile acres lie fallow. Brazil's Amazon basin (nearly one-twentieth of world's land surface) is still virgin soil.

NEW WORLD STRATEGY FOR SURPLUS STOCKS

NEWS ITEM: A 100 million dollar World Food Programme using surplus food to promote economic and social development, and conducted jointly by FAO and the U.N. is expected to go into operation by mid-1962 following final endorsement of the plan by the U.N. Economic and Social Council in April of this year.

THE global picture of millions of people going hungry in many countries while the well-fed inhabitants of others put great surplus stocks into storage has been described as "the paradox of a world starving to death knee-deep in food." The paradox is more apparent than real, however, for if all surplus stocks of food were shared out they could nowhere near meet the needs of all the food-deficient countries.

The primary answer to the world's food problem is the development of food production where it is needed. With a few exceptions the underfed countries have the basic conditions necessary for producing more food. They have fertile land, manpower, and water to bring up the crops. Scientific knowledge and advice are available and are being made increasingly available. But these are not enough. More complicated resources must be unlocked: dams and irrigation channels must be built; fertilizer factories and seed farms must be set up and vaccines produced to protect livestock against disease. Schools and colleges must be built and staffed to produce a new generation of skilled and scientific agriculturists; roads and railroads must be developed.

These are the material resources needed. If the under-privileged countries are to accumulate these resources by themselves from the little bit of their production that they can spare over and above their day-to-day needs they will be a long time accumulating them.

The fact is that there is very little surplus income to spare for long-term investment in most of these countries. Their choice is between reducing even further the standards of living of their people in order to devote a larger part of national production to long-term development, or inaction which will perpetuate the present conditions—unless help comes from outside.

Since the war substantial aid has been coming from the more prosperous nations. Under a plan begun in 1954, for example, the U.S.A. has given away or sold on special terms 10,000 million dollars worth of food and farm products to 40 countries. Since 1960 this programme has been enlarged in the U.S. "Food for Peace" plan. Canada and Australia have also been in the forefront of surplus food distribution to countries within the British Commonwealth under the Colombo plan. But until now almost all past surplus disposal programmes have been carried out by bilateral arrangements and not as a world-wide plan.

In October 1960, the U.N. General Assembly unanimously adopted a resolution, proposed by the U.S., asking for a study of the possibilities of distributing surplus food through the United Nations system as a contribution to social and economic development. As a result, in June 1961, FAO presented a report to the U.N. Economic and Social Council for a plan to "end the days of surplus food **disposal** and usher in an era of surplus food **utilization** for the social and economic development of the world at large."

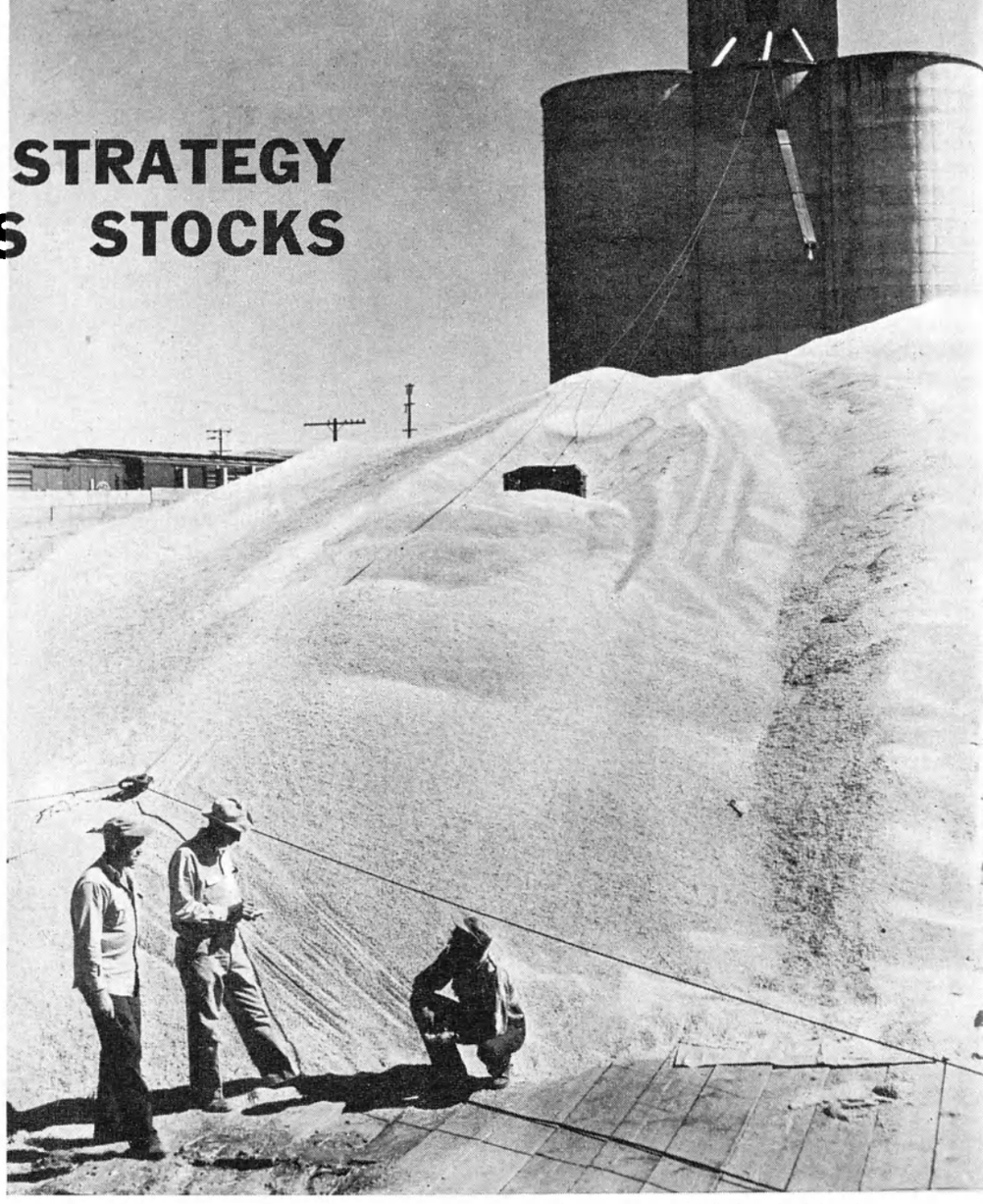
Entitled "Development through Food" (see bibliography p. 64), the study examined the potential uses of aid in the form of food in under-privileged countries; it showed how surplus food supplies could be used as capital to help give work to unemployed men on development projects such as roads, dams, school buildings and industrial schemes, the workers being paid partly in food, or the recipient country selling the food to its people (thereby helping to combat inflationary prices) and using the resulting domestic currency received to pay wages and other national development costs. The report also showed how surplus food could be used to establish national food reserves, allow governments to undertake land reforms without causing crippling food shortages, and be used in developing livestock industries by taking pressure off eroded and over-worked grazing lands.

Food surpluses could also provide school lunches and supplement the rations of workers on special heavy industrial development projects. Finally, food surpluses could be used for more effective international emergency relief in cases of disaster.

On the basis of this study, the FAO governing conference last November approved the plan for a World Food Programme to be carried out jointly by U.N. and FAO with headquarters based at FAO in Rome, and working under the supervision of a 20-nation Intergovernmental Committee. This group met in February and drew up details for the establishment and operation of a $100 million three-year World Food Programme with voluntary contributions made in food, cash and services.

It was this plan that the Economic and Social Council approved in April thus giving the green light to the World Food Programme. A special "pledging" conference is expected to be held later in 1962. But already the United States has pledged $40 million worth of food, and Canada and Denmark have offered $5 million and $2 million respectively in food and cash.

The World Food Programme opens a new international chapter in the problem of distributing food surpluses to those regions where there are food shortages and where they can do the most "economic and social good."



USIS

OVERFLOWING grain storage elevator in the U. S. A., which has large surpluses of agricultural produce. A large-scale distribution of surplus food through U.N. channels should now help under-privileged countries

THE ANATOMY OF UNDERDEVELOPMENT

With this issue The Unesco Courier begins publication of a series of articles on the main aspects of the economic development process, particularly as they impinge on the work of the United Nations family of organizations. These articles are taken from a new study produced by the United Nations as part of the World Campaign Against Hunger.

HARDLY any international problem is more frequently discussed in our time than economic development. Few questions, however, are more complex or less understood by the non-specialist.

An important initiative within the context of economic development was taken on July 1, 1960 when the Food and Agriculture Organization of the United Nations launched the Freedom from Hunger Campaign.

Dr. Norman Wright, Deputy Director-General of FAO, has said that, "from the physical and biological point of view," there is no reason why food production should not be expanded to meet even the world's anticipated needs, at least to the end of the century.

It is important, however, to view this authoritative statement realistically. It will not be possible to undertake and, still more, to sustain so great an increase of food production without the help of economic and social measures which go far beyond the improvement of agriculture and fisheries. It is this background theme which is treated in the present study.

A major objective of economic development is to ensure higher earnings, and therefore increased purchasing power, for the mass of the people in the economically less developed countries, of which many are the concern of the Freedom from Hunger Campaign. It is well-known that most of the inhabitants of the poorer countries have to spend a much higher proportion of their earnings on food than do most of those in the countries classified as economically advanced. The margin of money left over for other purposes is therefore pitiably small and this fact serves as a brake on the whole process of economic development by which alone the lot of the impoverished and underfed could be improved.

Some simple figures on earnings give further point to the existing imbalance. In 1959 the average annual per capita income was about $2,250 for the United States, about $1,000 for some of the West European countries and for Australia and New Zealand. For the less developed countries as a whole it was in the neighbourhood of $100 with an average of only $70 - $80 over great areas of Asia, Africa and Latin America.

This imbalance is likely to become more and more marked for, at the present time, average incomes are increasing very much faster in the more prosperous countries than in the rest. During the 1950's they rose by over $200 in the United States and Western Europe and probably by less than $10 in the other countries.

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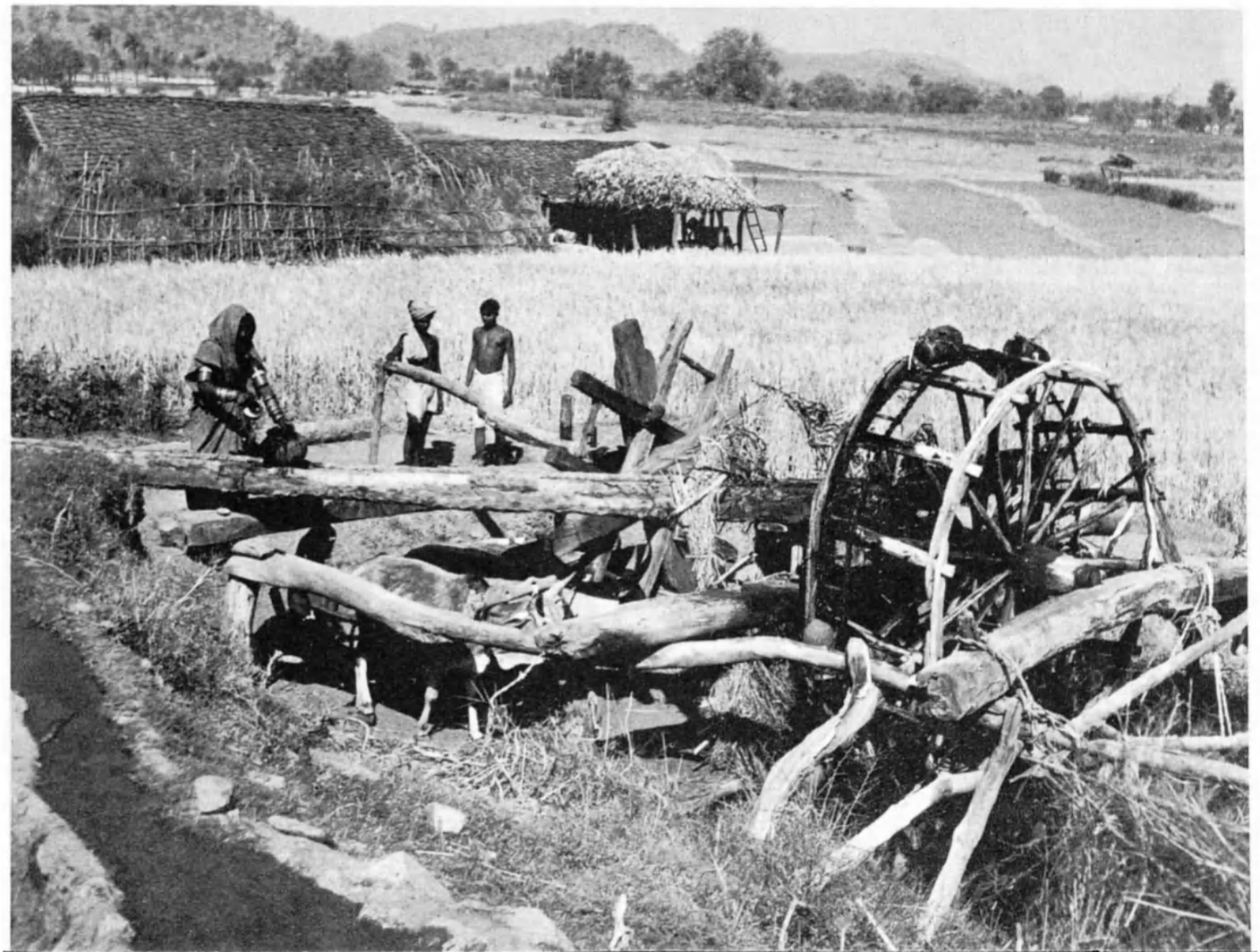
© Sunil Janah, Calcutta

Ancient water wheel of the kind still used to irrigate crops in India.



All countries in some way underdeveloped

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If countries classed today as economically underdeveloped are to experience a real rise incomes and to move into the category of the more prosperous, malnutrition is one of the principal evils which must be attacked. It is, however, by no means alone. Both health and education need to be vastly improved. Technical training must make possible a far better utilization of resources. The economies of countries that depend for earnings on one or two primary products must be diversified to absorb the shocks and uncertainties of world trade. Capital must be forthcoming for investment in roads, railways, harbours, airfields, factories, hospitals, schools, training colleges, as well as for industry.

It is therefore important to see hunger and malnutrition as part of a vicious circle of factors opposing economic advance. The physical weakness to which they give rise reduces the working capacity of many millions and opens the way to increasing poverty and disease. Disease is hard to combat where the hungry and poverty-stricken are ignorant of hygiene, but their ignorance also extends to the new techniques and methods which, if introduced among them, could help to increase their output of food, both to eat and to sell. Until far-reaching measures are taken in the economic and social fields, these people will have neither funds to start the process of economic development nor the possibility of acquiring them by their own efforts.

While the problem of eradicating or reducing hunger is not one that can be approached in isolation, malnutrition constitutes in itself a major obstacle to economic progress. Not much is likely to be accomplished in other respects, as long as hunger continues to afflict so many of the world's potential producers of wealth.

Each of the two forms of solution—the direct or agricultural approach to the production of food and the indirect approach through a supporting movement over the economy as a whole—must pay full attention to the needs and problems of the farmers, not only because it is they who produce the food but also because they still form a majority of the world's population. Their co-operation will be essential to any programme by which economic progress is sought through industrialization and other methods not connected with food production as such.

General industrial and economic development is a vital part of Freedom from Hunger. The success of that campaign depends upon expanding *markets* for food as well as upon rising *production* of food. Increased commercial demand for the food that farmers produce can come only from greater buying power on the part of consumers who are not farmers, both in the same country and in other countries.

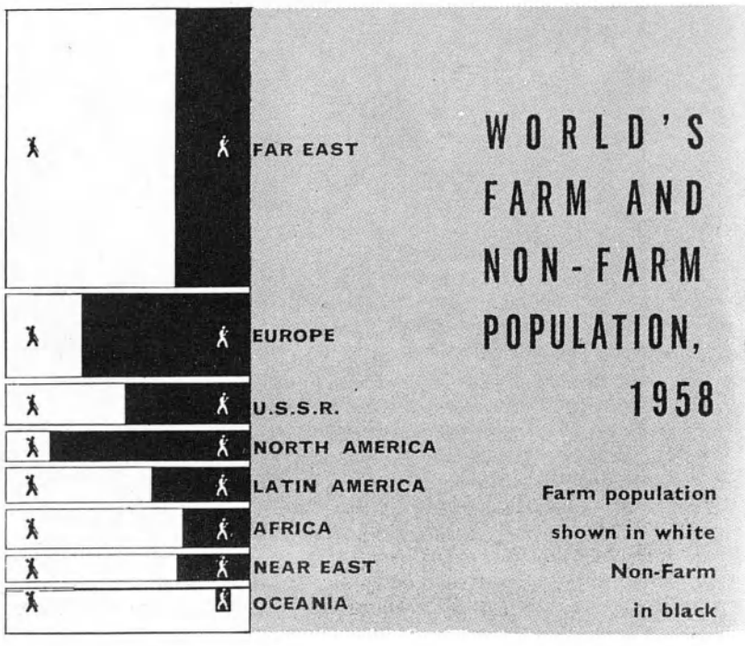
Economic development, putting more people at work, and raising the productivity and the income of workers generally, is the only road to greater buying power and greater demand for food. For all these reasons, speeding economic development is one of the essential steps towards a world free from hunger.

What do economists mean when they call a country underdeveloped? The expression "underdeveloped" is difficult to define in precise terms.

All countries are in some respects underdeveloped, for all are still in the developing process. There is none which has reached the stage where no further progress is possible or where no useful changes could be introduced. It is nevertheless clear that we can distinguish between those countries which have reached an advanced stage of economic development and those who are still in a more primitive phase.

Probably the broadest distinction is to be found in the distribution of the national income through various levels of the population. Those countries which are economically advanced have a much higher general level of prosperity and superior standards of living among the mass of their people.

(To be continued)



LEPTIS THE MAGNIFICENT. To the people of present-day Libya launched on a programme of economic betterment and higher living standards, the magnificent ruins of Leptis Magna, one of the oldest cities on the Tripolitanian coast, are a reminder that their forebears built grandly and lived well on the products of a then fertile soil. Buildings like amphitheatre (above) with its colonnaded courts, made Leptis one of the proudest cities of Roman Africa.

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WAKING THE SLEEPING LANDS

by Kathleen McLaughlin

THE MEDITERRANEAN REGION has been called the cradle of western civilization. Since the prewar era, the cradle has been rocking again at an unprecedented rate.

In 1937 the population was 136,000,000. By 1957 it was up to 175,000,000. Statistics indicate that by 1975 it will have reached approximately 275,000,000.

From any angle, an 80 per cent upsurge in population in less than 40 years poses grave problems. They become graver when, as in this instance, the countries affected can even now provide only a pinched existence for their multitudes.

Here civilization is in a race against the calendar. Economic progress must be accelerated, while the margin of time still holds, between the rising generation and looming disaster.

The challenge is to erase deterioration stemming from a thousand years of misuse of the land; to achieve balance between agriculture and other sections of the economies; and to lift average per capita income to a point somewhat more comparable to that of industrialized nations.

For countries on the European side of the Mediterranean, conditions are less difficult and prospects brighter than for the Middle East and African nations on the opposite shore.

Despite severe handicaps, progress here has been

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Where every drop of water counts

definite since 1950. In industrial phases at least, advancement has been fairly remarkable and regardless of fluctuations, national income has risen at the satisfactory average of six per cent annually. To expedite improvement, United Nations experts contemplate measures tailored to conditions in each country. For these southern European nations the goal is to raise gross domestic production from $27,500,000,000 in 1956 to $69,000,000,000 by 1975, continuing the present rate of advancement of five per cent per year.

Across the water to the south, the assets in the Middle East and North African countries shrink in ratio as liabilities expand. Four-fifths of this land is desert. Inadequate communications have always hampered efficient administration, and destructive use of the soil continues virtually unabated.

Average per capita income in these countries at present is just about $155 a year.

In the Middle East and North African countries the U.N. objective is to bring their combined production to $29,000,000,000 by 1975. The proposed annual rate of increase of 5.5 per cent would be more than twice the current momentum. This would double the 1956 agricultural volume, and triple the output of goods and services.

More than five years ago the United Nations began assessment of debits and credits that would have to be weighed, within the scope of the Mediterranean project. Experts compiled the data and wrote the report. Its more than 200 pages of text, tables and graphs show widely divergent conditions, rates of progress, and future potentials.

Water is the key to the major problems. Enough dams, reservoirs and irrigation canals to conserve and utilize rainfall and surface waters to the maximum would open up and make arable extensive areas not now cultivated and increase many-fold the yields in those presently tilled. Systematic searches for underground water sources are already proceeding. Adoption of dry-farming methods in the most amenable arid areas holds further promise for the unfolding years. Reforestation of suitable treeless areas is a "must".

Here is a project of proportions so mammoth that it has taken years merely to outline what must be done, and where, and when. There is only one executor possible —the United Nations and its family of specialized agencies.

By this time the natural priorities have been worked out. In the van will come the United Nations Special Fund to make the indispensable preliminary surveys, whenever the resources of a country prove insufficient to finance them alone. Once the findings have been weighed, plans can be adjusted to determine which of the other agencies will be required, and on what scale and timing.

FREQUENTLY FAO or ILO or WMO will have had occasion to make concurrent preliminary reconnaissances in their particular spheres, and can plunge forthwith into their different programmes. UNESCO will take on the educational facets and WHO will set about prevention and control of any existing communicable diseases, as well as teaching hygiene and sanitation, opening clinics and instructing native technicians.

There will be need in plenty for OPEX (Operation and Executive Personnel), to recruit administrators for two- or three-year contracts, to serve in and with the ministries of countries still plagued with a shortage of top-flight officials of their own. Each one will train his successor "on the job."

To forge ahead in its contest with population growth the Mediterranean region must plan shrewdly and swiftly, taking first things first. Encouragement for those most hopeful of progress came recently through a decision of the Special Fund to help finance several long-term development projects there.

They cover ground-water development in Greece; pilot-programming of the Antalya area in Turkey; watershed management and ground-water collection programmes in Israel; soil surveys and irrigation and drainage projects in the United Arab Republic; agricultural research in Tunisia, and a survey for preparation of an agricultural development plan in the Rif region of Morocco. Total investment by the Special Fund will amount to $3,624,100.

In these cases the Special Fund leads the way for eventual programmes which sooner or later will engage the services of every one of the U.N. agencies, as many are already at work in some of the countries named. They are active on reform of land tenure systems; water and flood control; training of additional technicians; weather and climate recordings; civil aviation problems; transport and telecommunications; health services; and improvement of basic energy supplies.

All these and many more aspects of life in the Mediterranean countries have to march forward in concert if the region is to be saved and restored to its former glory as the centre of western culture and civilization.

SPACE precludes detailed examination of the individual countries and their pace of progress to date, with "assists" from certain U.N. agencies. One country closeup, however, can bring the scene alive.

On Christmas Eve of 1951 a new and sovereign nation emerged in an ancient land on the shores of the Mediterranean. Libyans celebrated in an atmosphere of gaiety touched with solemnity.

Their ancestors in past ages had walked proudly and built grandly, but on that December 24 of Libya's independence only crumbling ruins were left to testify to their imposing cities, their thriving commerce, the productiveness of their once fertile soil. Even in decay, the great city-port of Leptis Magna, birthplace of one of Rome's greatest emperors, Septimus Severus, still speaks eloquently of former beauty, culture and prosperity.

Rarely has a state raised its standard with so little on which to rely to meet the expectations of the future. With one of the lowest levels of living in the Middle East, and a very high birth rate, Libya had few apparent natural resources; a terrain 85 per cent of which is sand and rock desert; light and capricious rainfall, and frequent droughts.

Only 5,000 Libyans had had as much as five years of schooling, and there were just 14 university graduates in the entire country.

Civil service administrators were nonexistent for fairly obvious reasons. Under the Italian occupation they were neither required, nor trained. In the postwar period of United Nations trusteeship the three provinces—Tripolitania, Cyrenaica and the Fezzan—were administered by the British and the French, engrossed with immediate emergencies.

The most fertile soil occupies a narrow strip bordering the Mediterranean. The rest is now arid, except for a few oases. Yet 93 per cent of Libyan production is agricultural, and 87 per cent of the population depends for its living on the land. More than 90 per cent of the people are nomadic, roving with their herds in search of pasturage and practicing shifting cultivation.

As a "Child of the United Nations," Libya looked for economic and financial help to the same source from which had come its political sovereignty.

United Nations technical assistance in the average less-developed country is confined to a few sectors of the economy. In Libya, it has radiated out in every direction like the spokes of a wheel.

On this largely barren land a depressed agriculture has been and remains the crux of economic woes. At times a score of experts from FAO have been busy there on a wide variety of projects.

Since 1953 Malcolm Arnott, an Australian sheep expert,

CONT'D ON PAGE 60

FROM SAND AND DESERT ROCK

Since achieving independence in 1951, as "A Child of the United Nations", Libya has been striving to overcome overwhelming obstacles to economic and social development: a terrain 85 % of which is sand and rock desert, sparse rainfall and a depressed agriculture (on which 87 % of people look for a livelihood). With help and advice from U.N. technical assistance specialists, more and more farmers are replacing outmoded farming methods (left) with newer techniques and better tools. Under a programme to achieve a better balance between farming and other sections of the economy, young Libyans receive technical instruction (below) in the Vocational Training Institution at Tripoli

Unesco photos

Metamorphosis of a nation

has been in Libya, commissioned by FAO to improve the breed of fat-tailed Barbary sheep as a first step toward establishment of an industry to supply wool blankets and carpets. These animals, believed to be survivors of flocks that roamed the Nile valley as long ago as 2,000 B.C., represent the wealth of the nomads.

Tough and hardy, they are among the few beasts able to subsist in so inhospitable an environment. During drought periods they live on the fat stored in their tails, while other animals perish of thirst. This hazard has been reduced through the sinking of tube wells, the stocks of fodder and the re-seeding of ranges fostered by Mr. Arnott and his colleagues.

Estimates are that some 7,000 sheep alive today would have died under conditions prevailing only a few years ago, and that 20,000 others have reached a peak of physical well-being.

On two experimental farms in Tripolitania the Australian has scored notable gains with his work of up-grading the strain. From Turkey he imported the superior Karaman type for selective cross-breeding with the Libyan Barbarys, whose short, nondescript coats held scant promise of the quality of wool fibre demanded for rug-making.

He introduced inoculation against the diseases and pests to which all sheep are susceptible; the process of the sheep-dip to prevent their recurrence; mechanical wool-shearing, and other modern techniques.

Nomads who paused in their wanderings for a look at these goings-on were more than cynical at first. A couple of years later they were inclined to be impressed, scanning the first generation of the new strain produced by cross-breeding, and comparing their larger, sturdier bodies and thick white fleece with their own rag-tag and bob-tail sheep. About 100 owners of sizable flocks have adopted these procedures, and have been more than gratified by the visible improvements. Converting the nomad sheep farmers will take time, but the trend is gaining.

Since 1956, the principal research station for sheep-improvement has been competently operated by a young Libyan, trained under the EPTAS fellowship programme in a two-year course in Australia. Arnott has moved on to establish another in the Fezzan.

On permanent farms response has been speedier and resistance far less. At points, dry-farming methods have been demonstrated, as they are practiced in the southwestern Great Plains region of the United States, and in the dry areas of Australia. Each season they have been adopted by more of the cultivators. The Government allocated $411,000 for the purchase of the requisite equipment, earmarking almost one-fourth for improved types of hand tools.

The latter were loaned without fee to the farmers co-operating. Scythes, motor pumps, animal-drawn carts and steel ploughs replaced many of the primitive sickles, spades, wooden plough, stone hammers and threshing sledges used in Libya for centuries.

They have helped materially in lifting the annual output levels. They have also provided an appreciated dividend, by way of their contribution toward modest rises in rural living standards.

Heavier, powered machines were put into Cyrenaica province in the autumn of 1958, accompanied by demonstrations of their use and care. In that season 6,600 acres of forage and cereal crops were seeded and cultivated, most of which would normally have been allowed to lie fallow. The superiority of the yields carried its message. In 1959 the acreage was tripled.

BLINDFOLDED STUDENTS learn touch-typing in clerical classes of Libya's Vocational Training Institution at Tripoli. In a country in which, ten years ago, only 5,000 people had had as much as five years of schooling and civil service administrators were non-existent, clerical class students can find jobs immediately on completion of their course.

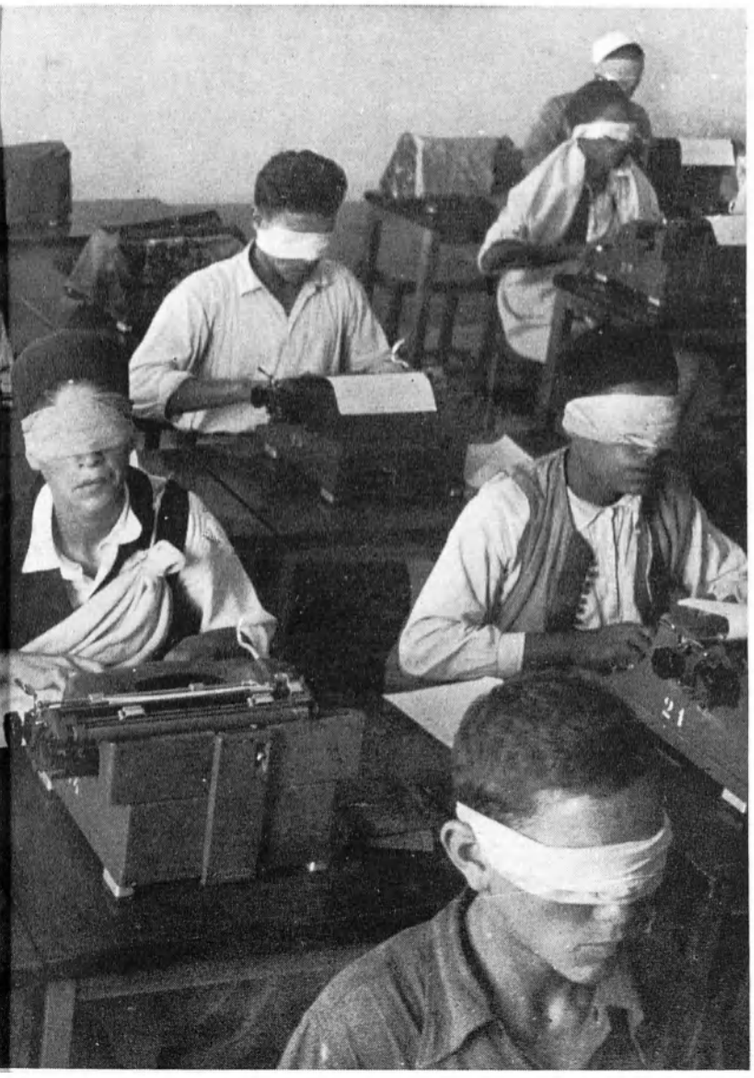
A MATTER

The problem before us is that of overcoming grinding poverty—nothing more, nothing less. The challenge of survival boils down to this: we must multiply today's output of goods and services. It is food that hungry mouths need, employment that idle muscles long for, creative tasks that their minds and energies are eager to tackle.

Can we win this war against want? Can enough be accomplished in time to meet reasonable demands of these people now on this planet and those of the tremendous numbers of additional people who will be with us in the near future?

In every phase of agriculture the gradual evolution continues. The Government actively supports mechanization and newer techniques; extended use of chemical fertilizers; dissemination of better seeds; credit plans for farmers; anchoring of shifting sand dunes by plantings of grasses and shrubs; the processing and marketing of dates; the spread of veterinary services, and training of students destined to administer the extension services familiar in more advanced countries.

Education from the primary level on up was imperative in Libya. But in a country with so many illiterates, few teachers could be located. They had to be trained, and the question arose—where? Existing schoolhouses were either destroyed or badly damaged, and were in any case far from adequate in number. Makeshift quarters had to serve, and many Arab-speaking instructors were made available through a cultural agreement the Government signed with Egypt.



Unesco - Guy de Belleval

Improvization, under the circumstances, was a natural alternative for one of the educators sent by UNESCO to organize a primary grade system in Libya. Dr. Adeline Babbitt of the United States calmly seated her classes of small pupils on the ground. She used the sand for a blackboard on which to do sums, draw maps or teach writing; date pits and small pebbles to inculcate the fundamentals or arithmetic, and a story-hour to convey the lessons of history in the absence of textbooks, blackboards, paper or pencils. And the children learned.

Conditions improved gradually. Buildings were repaired, class-room equipment was provided, young Libyan teachers managed to keep at least one lesson ahead of their students. Enrolment grew, especially among girls, for whom educational opportunities have traditionally been all but nonexistent.

At the elementary level an increase of 119.7 per cent was registered for girls in the first five years of free schooling, compared with 69.2 per cent for boys. By 1957 school attendance for both was 46,299 as against 26,269 in 1952. Libya does not yet boast a university, but in the first half-decade preparatory school enrollment rose from 393 to 1,954, or 497.2 per cent, and that of secondary schools from 142 to 620, or 436.6 per cent.

Star rating for performance belongs to the Libyan Government Vocational Training Institution at Tripoli, which the International Labour Organization of the United Nations took over in 1953. By 1957 ILO representatives were able—on schedule—to turn over the installation to Libyans they had prepared, and who now carry on as instructors.

From the beginning, the objective was to train junior-grade skilled workers for Government shops. Need for the former was so intense that a veritable tug-of-war developed over these youths. Instructors struggled to keep them at their desks until they had finished their courses. Administrators tried to wrest them away prematurely, to fill some of the yawning gaps in their bureau staffs.

Yet since 1952, 500 clerical-section students have been graduated, and snatched up promptly for waiting jobs. Much more time and effort has been needed to place technical-section graduates, numbering about 300, although prospects brightened so much last year that the United Nations Special Fund has allocated over $1,000,000 to help establish an institute of higher technology.

There, young Libyans will get training in mechanical, civil and electrical engineering as well as in food processing, to meet demand for technicians in Government and in private enterprises. The staffs to date have comprised largely foreigners. The Government will furnish $2,000,000 toward the $3,057,800 cost of the five-year programmes.

Recently the whole Libyan situation took a sudden and dramatic turn, with the announcement of oil strikes in the desert. Government contracts with foreign oil companies for exploration rights now promise to pay off fairly handsomely.

If indeed, oil and gas revenues from the Libyan desert are about to propel into relative opulence a nation so long and so harshly buffeted, its people are better prepared than before to sustain the symbolism of magnificence their forbears expressed exquisitely in Leptis Magna, 2,000 years ago.

This article is condensed from a chapter in "What's the U.N. Doing There —Some Success Stories of United Nations Technical Assistance," by Kathleen McLaughlin, published by the Institute for International Order, New York, 1961. For copies write to: Institute for International Order, Suite 1034, 11 West 42nd Street, New York 36, N.Y.

OF LIFE OR DEATH

The job before us is indeed one of appalling dimensions, of bewildering complexity and terrible urgency. But that job is not insuperable. There is no question in my mind that at least ninety of the hundred low-income countries have the resources—physical and human—to provide in reasonable time decent living standards for their people. The underlying reason for underdevelopment is under-utilization of these resources.

Paul G. Hoffman,
Director General of the U.N. Special Fund,
The War We Must Win, W.A.Y. Forum, Spring 1961.

Unesco - Alfred Bernheim

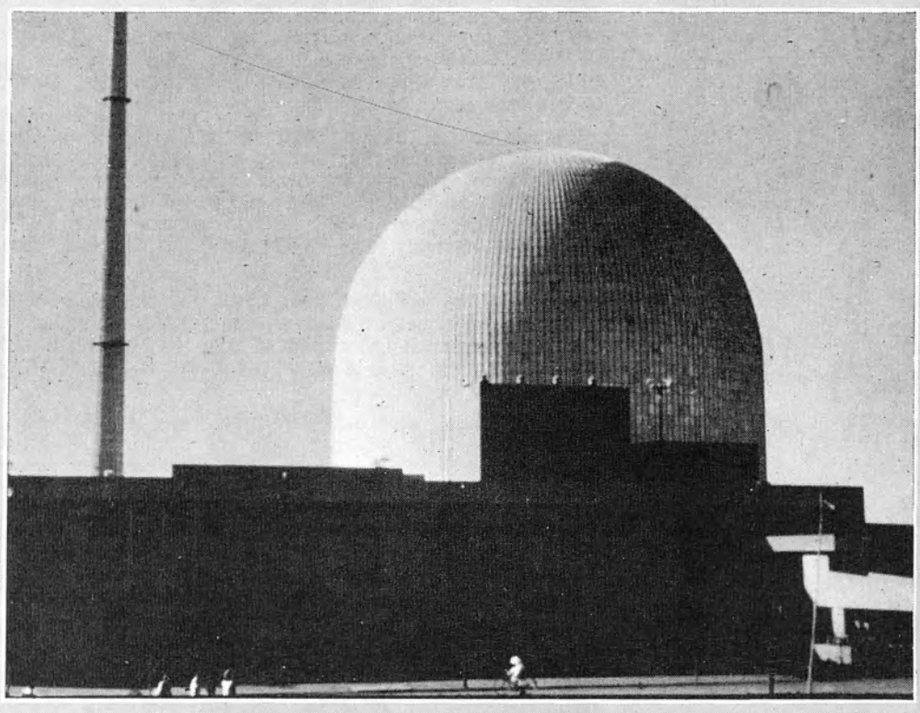
In Israel a combination of effort, skill and the application of science is vanquishing the desert and making crop growing possible in hitherto barren areas. Above temperature readings being taken at the Negev Institute for Arid Zone Research.

SEEDS FOR BETTER CROPS

In over 60 countries nation-wide programmes aimed at making available and promoting the use of high quality seeds—a vital element in obtaining better harvests—have been sparked by the World Seed Campaign, an integral part of the FAO Freedom from Hunger Campaign. Unesco has contributed to the World Seed Campaign by naming it as a Unesco Gift Coupon Project, thus enabling individual people, groups and schools to make donations to support it. Up to present gifts totalling over $30,000 have been received by Unesco's Public Liaison Division in Paris for the World Seed Campaign (Project N° 340). These funds are now helping to provide such items as seed stocks, equipment for processing and testing seeds and instructional equipment like films, projectors, filmstrips and publications.

FAO photo by Eric Schwab

At Cuttack in India, the FAO, in co-operation with the Indian and other Asian governments is experimenting in the production of new hybrid varieties of rice that will give greater yields. Rice is the basic food of half the world.



U.N.-UNESCO FILMS FOR TV SHOWING

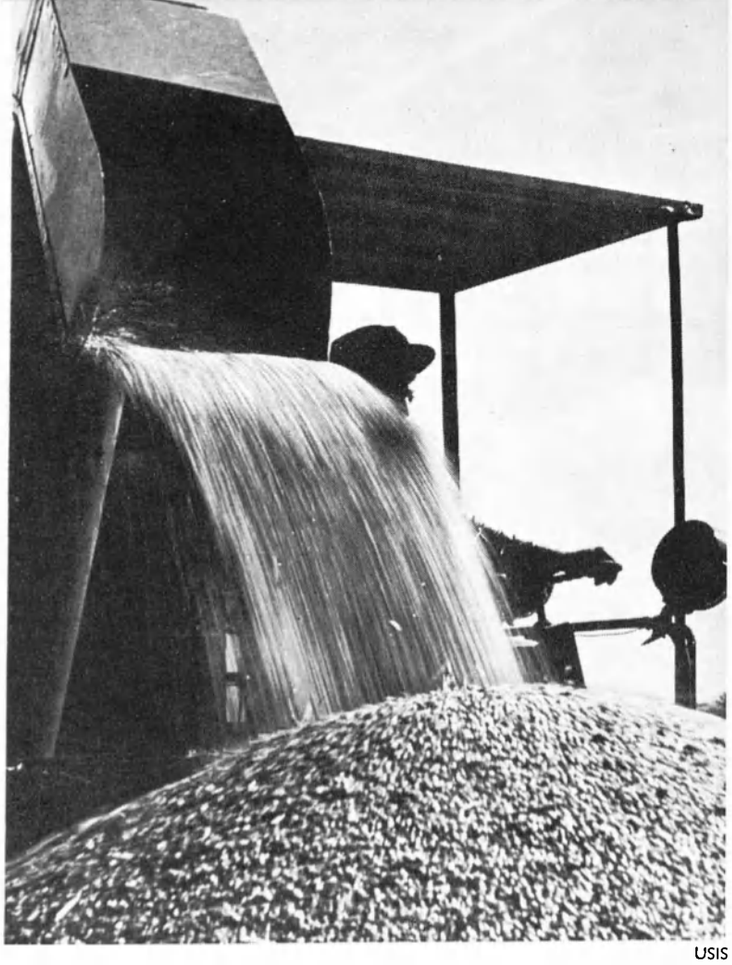
The United Nations and Unesco are at present preparing a series of three films on social and economic development in the world today, and some of the obstacles to it, including the problem of hunger. The films which will be completed later this year, are being written and directed by Stephen Hearst of the B.B.C. television service, who has been seconded to the U.N. and Unesco, and will be made available fur TV showing in various countries. Advanced stills published here show (left) India's new nuclear reactor at Trombe, near Bombay; (centre) heavy cargo being manhandled on the beach at Accra, Ghana. Method is now being superseded by use of modern port installations at nearby Tema; (right) money lender in India. Crippling peasant debts to money lenders in the Far East are one of the obstacles to agricultural productivity.

Photos U. N.-Unesco

Photo Vauthey © Almasy, Paris

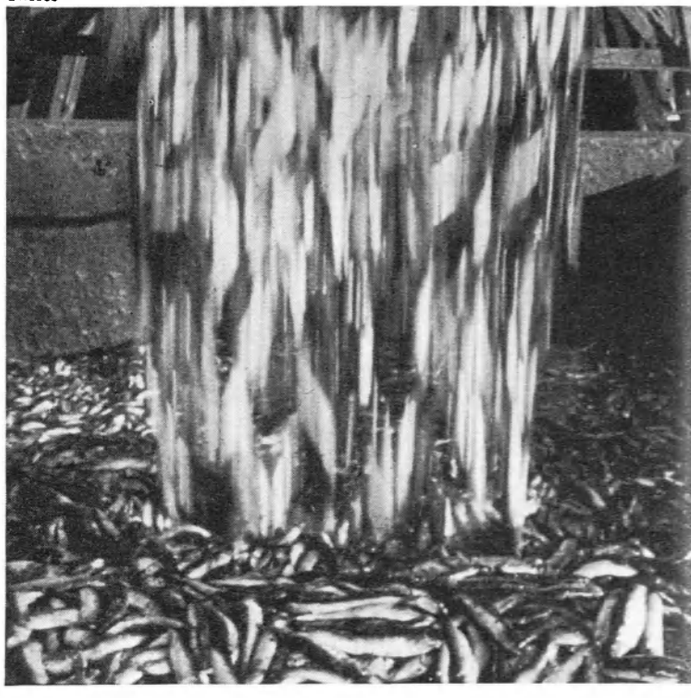
In West Africa, research is being carried out in these nurseries to determine which plants will grow best in the desert. Once established, the plant roots will help to fix loose, shifting sands and plants will provide cover for a natural soil regeneration.

THE PROMISE OF LAND AND SEA



USIS

Unesco



The potential produce of the earth, if sought after with skill and energy, would provide adequate sustenance for a world population far greater than exists today. Already in some of the great producing countries, rich harvests leave ever greater surplus stocks of grain (above). As for the oceans, they are an inexhaustible storehouse of food from which man has hardly begun to profit. The possibilities of the sea are shown by the case of Peru where annual fish production (right) has increased during the past 16 years from 30,000 tons to four and a half million tons.

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Letters to the Editor

VICTORY FOR FREEDOM, DEMOCRACY AND...

Sir,

I am sorry to see that a reader, M. Thumble, expressed his contempt for the French Revolution and its "panegyric" which he says THE UNESCO COURIER published in "The Story of the Metric System" (March, 1962). I believe that this was the greatest event of modern times and though it may appear to some as "the most savage and sanguinary period of French history", historically it is a period so rich in idealism as to be unparalleled in world history. Despite innumerable crimes, terrible injustices and cruel repressions, the sons of France won for the whole world the freedom and democracy which are the paramount values of our present age. I am a student and in the textbooks scorned by M. Thumble I find all the facts that have been confirmed by historical texts. If it were not for the French Revolution, he would not be able to say the things he did about your article.

Fernando Meacci
Lonigo, Italy

... DECENT LIVING STANDARDS

Sir,

I am a labourer and I believe that the French Revolution and the Republic were decisive factors for progress. You were more than justified in evoking them recently in "The Story of the Metric System." It is thanks to them that we have been able to achieve better standards of living.

Lucien Vermède
Nimes, France

PRIZE FOR FRIENDSHIP

Sir,

I agree that THE UNESCO COURIER should be widely publicized and in this connexion I think you might be interested to know that for the past two years the father of a boy attending a Buenos Aires school has offered a year's subcription to your magazine as a prize for the boy judged to be "the best pal" by his schoolmates in each of the top primary school classes.

If this initiative was followed everywhere the diffusion of your magazine would be appreciably increased—as we all wish it could be.

R. Aprea
Buenos Aires, Argentina

NO ROYAL ROAD TO GEOMETRY

Sir,

Re "The Story of the Metric System": it is perhaps best to consider the metric system as the focal point of an historical controversy between physics and metaphysics; between idealism and realism. Its historical basis to the contrary notwithstanding, the meter owes its origin to the decree, or edict, or agreement of the International Metric Convention on May 20, 1875. Such a measure is a royal measure, or royal cubit, as opposed to a common measure, or common cubit.

Metaphysics postulates a straight line transcribed between two points. The distance between the points is not postulated and must therefore be proven. I say that a royal measure requires geometrical proof. Only geometry is the royal approach to the dimensional sciences; there is no royal road to geometry.

John F. Powers
Worcester, Mass., U.S.A.

THE POWER OF THE PEN

Sir,

I am a poet who lives in Fukuoka, south-western part of Japan. The Latin-American number of the Japanese edition of THE UNESCO COURIER gave me new hope when I came across the words "The Pen before the Sword" in the article "Prelude to Independence." History is a repetition of order and chaos. The Pen has lived through those changing years and has helped countries to independence. It has also given a much better life to people than in colonial days. I believe, not only in Latin America, but in other parts of the world there are great thinkers, writers, and philosophers who represent the power of the Pen.

Tagore, Schweitzer, and Pushkin must be counted as geniuses of this kind.

I hope THE UNESCO COURIER will issue a special number or use one of the numbers to introduce the works of these revered representatives of the Pen.

Sanruku Sugiyama
Fukuoka City, Japan

ED. NOTE: *The life and work of Rabindranath Tagore was the theme of our December* 1961 *issue.*

IN DEFENCE OF CHILDREN

Sir,

It it some time since I saw an article in your magazine on the problem of child education, though this is one of the most important aspects of the fight for peace and social justice—the aim of all international efforts. I should like to hear what your readers think about it. Speaking for teachers, I say that today's "education" is totally wrong because everywhere it is still based on coercion. We should speak out and act courageously against this brutal system. We should have laws and sanctions aimed against the inconceivable "right" to whip, torment and humiliate the weak and innocent. Already in 1937 Maria Montessori declared: "The child ought to be represented in his country's parliament; there should be a Ministry for Children." The UNESCO COURIER should lead a world campaign in support of these urgent, needful and humane laws.

Anna Mazziotti di Celso
Rome, Italy

WORK FOR TOMORROW TODAY

Sir,

To live in a harmonious world, whom should we educate or re-educate —the children or the adults? For centuries it has been said that children are the hope for tomorrow. But how can we properly plan a future without having a present? To protect children's rights with an international sense of responsibility we must begin by educating the educators. The men and women of tomorrow will not enjoy any peace of mind nor any political peace or plenty, if they are not made conscious of their responsibility towards life and mankind as a whole. It is not by filling our children's minds with intellectual or technological concepts that we shall succeed in protecting them of freeing them, or their children, from poverty and endless suffering. This result must come today through our own deep psychological renewal.

Pedro Ysas Ferrer,
Barcelona, Spain

A CLASSROOM AID

Sir,

Last year your magazine often replaced the reading texts I use in my secondary school classes. This I was able to do because of the keen interest shown by my pupils in ways of life, so different from ours, illustrated in your pages. THE UNESCO COURIER is a purposeful and important publication because it brings to our notice situations and problems that distance or lack of information generally keep in the dark.

M. Elisa Ghirlanda
Buenos Aires, Argentina

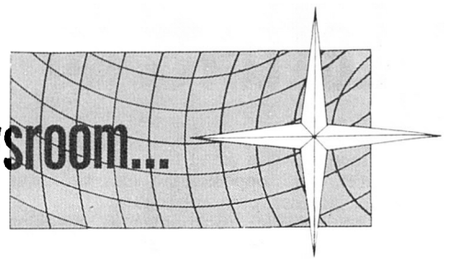
ARE WE POISONING OURSELVES?

Sir,

In your issue on "The Two Faces of World Health" (April 1962) you note the important change in medical science, with a new emphasis on preventative, as compared to curative, medicine. There is another, and to my mind important, factor, to which you did not refer: hygiene. It does seem paradoxical to find that bodily hygiene has greatly developed in the past half century, yet alimentary hygiene is retrogressing. Today it is practically impossible to find healthy, natural foodstuffs. From the earth itself which is "poisoned" with fertilizers so that it may produce bumper crops, to the flesh of animals reared on chemical foods and in unnatural living conditions, it is impossible to find the nutritive elements indispensable to health in their proper proportions. What one could say about bread is best left unsaid. Many doctors deplore this situation and fight against it—with medicines. Have we not here the subject of a campaign corresponding perfectly with THE UNESCO COURIER'S field of interest?

Michel Lambert
Paris, France

From the Unesco Newsroom...



A BOOM YEAR FOR EXPLORERS: The Royal Geographic Society in the United Kingdom has approved a total of 62 expeditions to be carried out this year in various parts of the world by 500 explorers—mostly university students. Expeditions range from a search for Phoenician wrecks off the coast of Sicily to the study of relics of Indian civilization on a site due to be flooded by a dam in Colombia.

ACTORS' SCHOOL FOR ANIMALS: A school in Oxfordshire, England, is producing a variety of well-trained professional animal actors and actresses destined to appear in films and on TV. Its pupils, include squirrels, horses, birds, cats, dogs, rabbits, badgers, goats and sheep.

CHILDREN'S PALACE IN MOSCOW: Built within a new park and surrounded by sports fields, greenhouses and a pond with a flotilla of boats, a Children's Palace, has been opened in Moscow. It has rooms for games, meetings and exhibitions and its annexes include a theatre, cinema, concert halls, a planetarium and an astronomical observatory.

A CURE FOR SHARKS: Australian skin-divers returned recently from the Great Barrier Reef after successfully testing a new weapon designed to kill their most deadly enemy, the shark. The weapon is a hypodermic spear gun, adapted from a veterinary hypodermic syringe, the needle being set in a cylinder containing poison which is in turn screwed on to an underwater spear gun. It is intended for use by skin-divers and life-saving teams in shark-infested waters.

NOT SO COLD CLIMATE: Two New Zealand scientists believe that the "warm waters" of Lake Vanda in Antarctica are heated by trapped sunlight and not, as hitherto thought, from a heat source within the earth's crust. When samples of sulphur from the lake were analyzed it was found that they did not have a volcanic origin, but came from sea water.

ALEXANDER'S FLEET IN SIGHT: Wrecks of several triremes believed to have belonged to the fleet used by Alexander the Great in his siege of Tyre in 332 B.C. have been found on the sea bed off the coast of Lebanon. Objects from Greek and Phoenician vessels have already been recovered here.

WEATHER FORECASTING MACHINE: Using an electronic calculator and information transmitted by radio balloons from 20 miles above the earth, meteorologists in Berlin are now able to predict weather conditions in a matter of minutes. The specially designed calculator can process in about three minutes complicated weather data that would have taken several hours by human calculation.

TRAINING CENTRE FOR ARAB EDUCATORS: A Regional Centre for the Advanced Training of Educational Personnel in the Arab States was opened recently at Beirut in the Lebanon by Mr. Kamal el Assad, Lebanese Minister of Education, and Mr. René Maheu, Acting Director-General of Unesco.

TOGO'S FIRST NEWSPAPER: The Republic of Togo now has its first newspaper, the "Togo-Presse" an 8-page tabloid published in French with one page in Ewe—Togo's chief vernacular language. It was created with the aid of Unesco Technical Assistance. Produced by an all-Togolese editorial and mechanical staff, it began life as a weekly publication, but is now being transformed into a daily newspaper.

SCIENCE KITS FOR BRAZIL: Nine thousand science teaching kits have been distributed to Brazilian schools by the Brazilian Institute of Education, Science and Culture, a branch of the Brazilian National Commission for Unesco. With these kits secondary pupils will be able to perform experiments in physics, chemistry, biology and natural history.

TUTANKHAMUN'S TREASURES ON TOUR: A selection of precious objects from the tomb of Tutankhamun, dating from about 1350 B.C., have been loaned for the first time by a Cairo museum and are now on a two-year across-country tour of 16 museums in the United States. It is hoped that the exhibition will stimulate interest in America in the Unesco programme to save Nubian monuments threatened by the construction of the Aswan Dam.

BIG-GAME HUNT WITHOUT GUNS: Covering over 4,000 miles on ski in the past two years, patrols of game experts, armed only with pens and notebooks, have been tracking bears, wolves, lynxes and wolverines in the north of Sweden to note their habits and movements. Although between 20 and 30 bears are shot annually, it is believed there are still between 250 and 300 in Sweden.

Flashes...

■ *Milk distributed by* Unicef, *during the past* 15 *years would fill* 22 *containers each as tall as the U.N. Headquarters Building in New York.*

■ *The Peruvian Government is devoting* 25% *of its budget to educational needs.*

■ *Samples of fossil pollen found on the now barren and desolate Easter Island in the Pacific, and analyzed at Stockholm's Museum of Natural History, suggest that the island was once covered with tropical vegetation.*

■ *In the past three years the U.S.S.R. has published* 1,540 *fiction works, totalling* 181 *million copies. These include books by writers of* 68 *countries.*

■ *Under a* $40 *million educational development plan, Ecuador is to construct* 9,854 *new classrooms by the end of* 1967.

■ *Canada has now joined* 40 *other countries in the Universal Copyright Convention under which states grant to foreign works the same protection accorded works by their own nationals.*

■ *Last year the World Health Organization undertook* 825 *projects in* 137 *countries and territories, its principal target being the world-wide malaria eradication campaign.*

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HIDDEN HUNGER

Chronic malnutrition, sometimes called "hidden hunger", claims most of its victims among young children, causing illnesses which prevent their normal development and producing long-lasting effects. **(See page 20)**